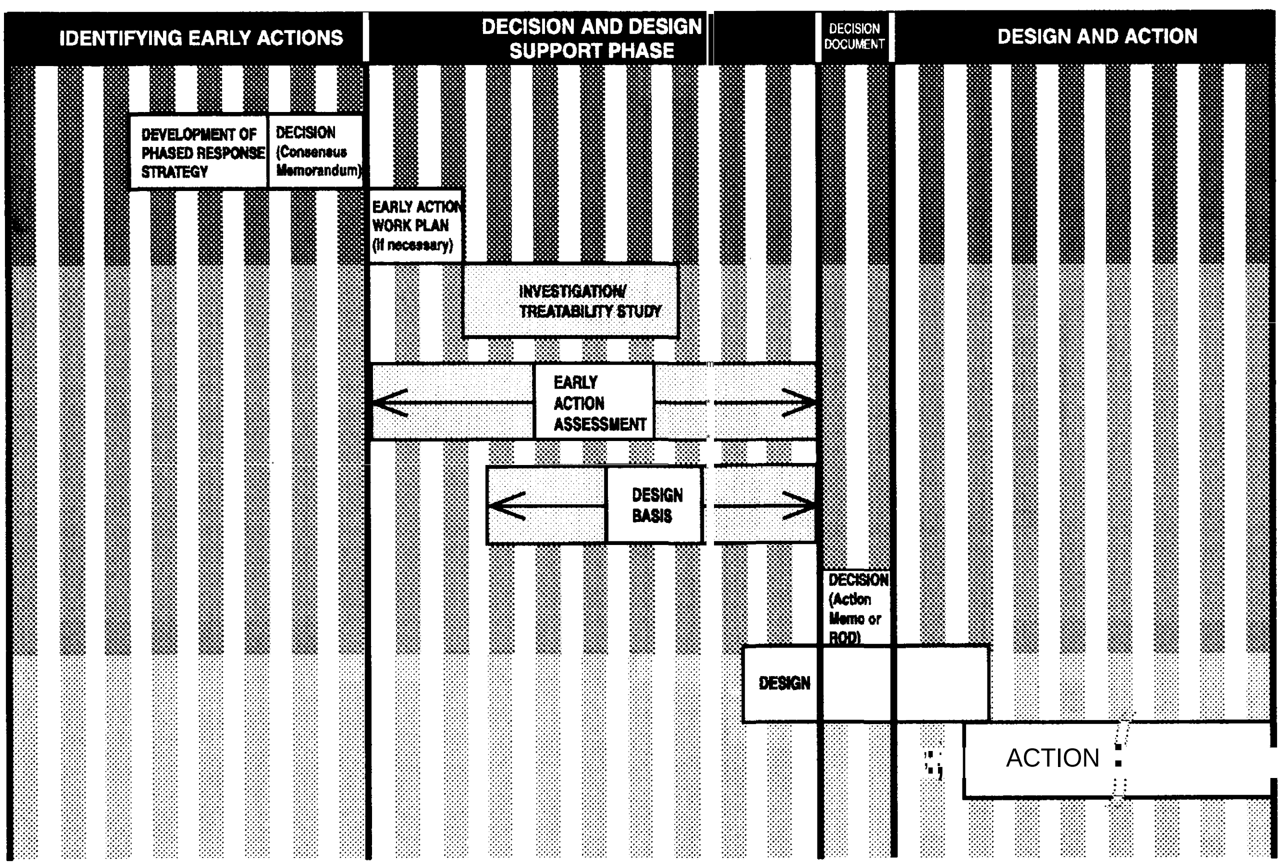
DOE/EH-0506

Environmental Guidance

Phased Response/ Early Actions



U.S. Department of Energy
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Office of Envlronmental Activities
(EM-22)

Office of Environmental Policy & Assistance
RCRA/CERCLA Division
(EH-413)

Module 3
Time-Critical Removal Actions

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Module 3
Time-Critical Removal Actions

Background

As part of a phased response strategy, time-critical removal actions are used to respond to threats or releases where planning can be completed in less than 6 months following issuance of an Action Memorandum. This module focuses on the planning and documentation requirements for time-critical removal actions and emphasizes ways in which the decision and design support phase can be streamlined and the documentation abbreviated (Figure 1 in the Introduction provides definition of the planning, and decision and design support phases).

The only regulatory distinction between the time-critical removal actions addressed in this module and the longer term actions addressed in Module 4, Non-Time-Critical Removal Actions and Early Remedial Actions, is that time-critical removal actions can be planned within 6 months, while the planning for longer term actions has no time limit. In fact, time-critical removals often are planned in a matter of weeks, while the longer term actions in Module 4 can easily require a year or more of investigation and planning before action begins.

Characteristics of situations appropriate for time-critical removal actions are:

- A release or threat of a release requires near-term action.
- The required response is fairly obvious and straightforward.
- Temporary or final waste management capacity is available.

A time-critical removal action can be implemented whenever these criteria are met. Examples of releases or potential releases appropriate for a time-critical removal are:

- Chemical or radiological hot spots that are readily removable and will be disposed of in an available onsite low-level radioactive waste (LLW) disposal facility
- Liquids leaking from drums that can be removed, overpacked, and temporarily stored onsite
- Solvent in soil that can be extracted using a temporary soil vapor extraction system

The Environmental Protection Agency (EPA) has established documentation requirements and procedural requirements for time-critical removal actions, which are incorporated into this module. The Department of Energy (DOE) has published procedural guidance for removal actions in CERCLA *Removal Actions*, which should be consulted as appropriate.

Executive Order 12580 delegated CERCLA Section 104 authority to the Secretary of Energy, making DOE the lead agency for removal actions at DOE sites. In this role, DOE has discretion in implementing time-critical removal actions and does not require approval from EPA or state regulatory agencies for their initiation. However, DOE field offices should not operate independently of regulatory agency or public involvement in implementing time-critical removal actions. Efficient development and implementation of time-critical removals will be best ensured by developing a cooperative working relationship with the regulatory agencies and other stakeholders.

Consensus on the need for and the scope and objectives of a time-critical removal action is developed by the extended project team in two ways:

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- Through the development of a consensus memorandum under a phased approach (see Module 1, Phased Response Strategy)

- Through the issuance of an action memorandum addressing a single action

Organization

Module 3 discusses the following:

- Developing the Conceptual Site Model
- Identifying Compliance Issues
- Developing removal action approach
- Developing Action Memoranduml/Removal Site Evaluation
- Developing Removal Action Work Plan
- Facilitating community involvement
- Resolving logistics for the removal action

In addition, more detailed information is provided in the following notes:

- Note A – Example Conceptual Model for a Time-Critical Removal Action at Mound

- Note B – Example Action Memorandum for a Time-Critical Removal Action at Idaho National Engineering Laboratory

- Note C –Example Outline for an Action Memorandum: Time-Critical Removal Action

- Note D –Example Outline of Removal Action Work Plan

- Note E– Example Design Basis for a Time-Critical Removal Action at Mound

- Note F –Time-Critical Removal Action Logistics Checklist

Sources

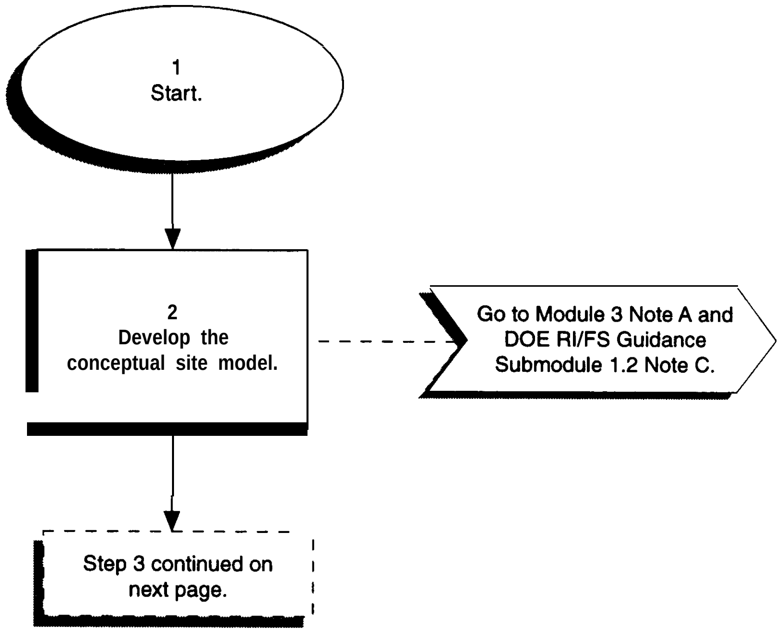
1. U.S. DOE, U.S. EPA, May 25, 1995, *Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), p.4.*

2. DOE. September 1994. *CERCLA Removal Actions. DOE/EH-0435.*

3. *40* CFR 300, March 8, 1990, *National Oil and Hazardous Substances Pollution Contingency Plan,* Federal Register, Vol. 55, No. 46 Rules and Regulations.

4. U.S. EPA, August 1993, *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA, EPA/540/R-93/057,* OSWER Directive 9360.0-32.

Module 3 Time-Critical Removal Actions



Step 1. Start.

Step *2*. **Develop the conceptual site model.** On the basis of available information, develop a conceptual site model of the problem and all features of the site that may impact the planning or implementation of the envisioned action. The conceptual site model is a summary of all available information about the site problem(s) being addressed, a combination of text and diagrams to provide a qualitative and (to the extent possible) quantitative understanding of the site problem(s).

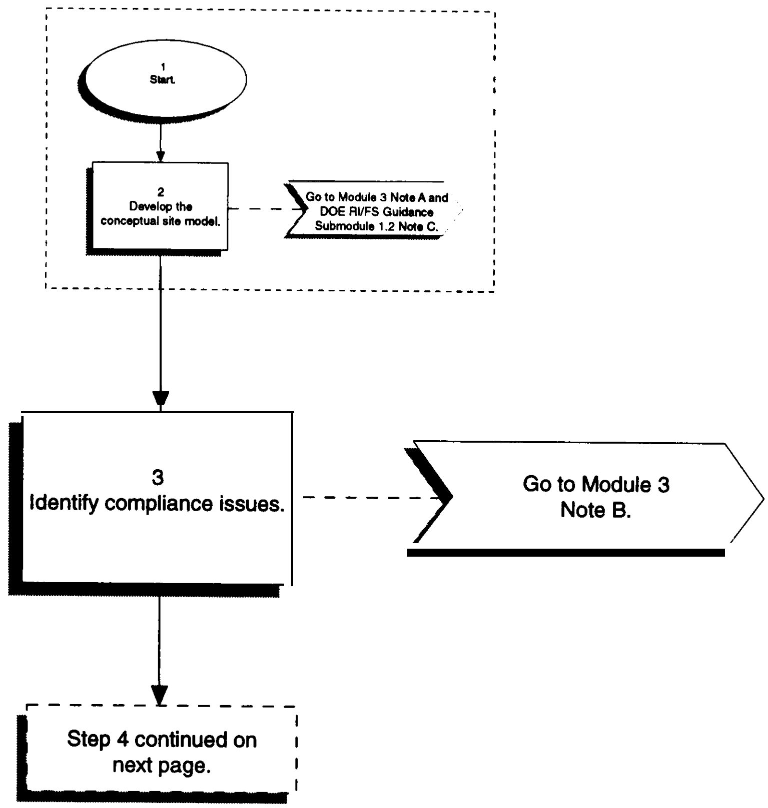
The conceptual site model is used to present site understanding in both the Action Memorandum/Removal Site Evaluation (Step 5) and the Removal Action Work Plan (Step 6). It serves three distinct purposes in a time-critical removal action:

- As the basis for identifying compliance issues that must be addressed by the time-critical removal action (see Step 3, below)
- As the basis for developing the removal action approach (see Step 4, **below)**
- As part of the assessment of the site problem required in the Removal Site Evaluation, including agreement of approach for data collection, if necessary (see Step 5, below)

The conceptual site model does not need to be elaborate or detailed. For example, if the action is to remove and stabilize drums of wastes, the critical areas of interest for the conceptual site model may be only the nature of the contents of the drums and the condition of the drums. If removal of contaminated soil under the drums is part of the action, the scope of the conceptual site model will have to be expanded to incorporate all that is known about the contaminated soil and all that might impact the planning for or implementation of the removal action. Module 3, Note A and DOE's RI/FS guidance, Submodule 1.2, Note C provide examples of conceptual site models. The example in Note A to this module was sufficient to support a particular time-critical removal action.

The conceptual site model also presents and explains uncertainties about the site problem(s) to be addressed by the removal action. Uncertainties are important if they represent potential changes to the remediation approach that might have to be made during the removal. For example, if the volume of contaminated soil for removal is not known with sufficient accuracy to ensure that available storage, treatment, or disposal capacity will be sufficient, then contingency plans for dealing with a larger than expected volume of soil will be critical. Each uncertainty potentially creates the need for a contingency plan that should be developed as part of the remediation approach (see Step 4). In some instances, these contingency plans will describe alternative actions to be taken; in other instances, the contingency plan for a given uncertainty may be to stop the action. For detailed guidance on developing and evaluating site understanding in early action see Submodule 4.1, Scoping. For detail on contingency planning see DOE's RI/FS Guidance Submodule 5.1, Alternatives Definition, and Module 7, SAFER.

Module 3 Time-Critical Removal Actions (cont.)



Step 3. **Identify compliance issues.** The beginning point of a time-critical removal action is a decision that a response is needed (i.e., something must be done about the release or threat of release) and agreement on the general nature of the response that will be undertaken. Once the decision has been made about whether to and/or how to respond, focus then shifts to the requirements that must be met while conducting the time-critical removal action.

Compliance issues that must be addressed:

- Assessment of applicable or relevant and appropriate requirements (ARARs)
- Statement of endangerment requiring a removal action

For removal actions, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires compliance with ARARs *to the extent practicable.* Determination of what is practicable is, to a large degree, based on the subjective judgment of DOE as the lead agency; however, gaining concurrence from the regulatory agencies on what is practicable will help ensure continued support of the extended project team. ARARs that affect worker health and safety, ARARs that are directly relevant to the actions being implemented (i.e., action-specific ARARs), and ARARs that cannot be deferred until the final ROD are generally complied with.

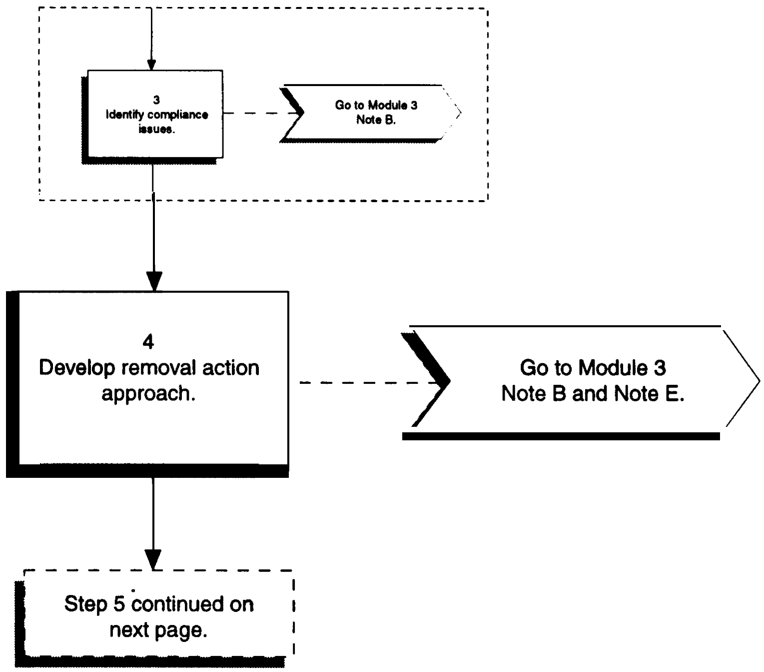
Module 3, Note B provides an example ARARs assessment as part of an Action Memorandum for a time-critical removal. This is an example of how “to the extent practicable” was interpreted for a specific action.

A risk assessment or risk evaluation is not required for a time-critical removal action. In remedial actions, risk assessments are generally used to demonstrate that a site poses a risk that requires action and to evaluate the effectiveness of various remedial alternatives. Neither of these purposes is relevant to a time-critical removal action because the only requirement to justify action is that one or more of the criteria listed in the NCP is met.

In accordance with NCP criteria [Section 300.415(3)(b)], a removal action may be appropriate where:

- DOE (as the lead agency) identifies the existence of a threat to public health and welfare or the environment, regardless of whether the site is included on the National Priorities List (NPL).
- Actual or potential exposure to nearby human populations, animals, or the food chain from substances or pollutants or contaminants is found.
- Actual or potential contamination of drinking water supplies or sensitive ecosystems is found.
- Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release are found.

Module 3 Time-Critical Removal Actions (cont.)



- Migration of high levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface is possible.

- Weather conditions may cause hazardous substances or pollutants or contaminants to migrate or to be released.

- Threats of fire or explosion are found.

- No other appropriate federal or state response mechanisms exist for responding to a release or threat of a release.

- Other situations may pose threats to public health or the environment.

Note that it is not necessary to demonstrate actual risk or even actual contamination. Potential risk or potential contamination are sufficient. Risk evaluation is made unnecessary by the urgency of the action being taken, by the focused nature of the action, and by the later opportunity (during final site actions) to address any residual risk not removed or mitigated by the removal. The statement of endangerment required in the Action Memorandum is supported by illustrating how the site problem meets one or more of the NCP criteria that warrant a removal action. Module 3, Note B provides an example of an endangerment statement for a time-critical removal. Worker health and safety issues are considered in the design and implementation of the removal action (see Step 4),

Step 4. **Develop removal action approach.** The removal action approach serves as the basis for implementing the removal action. The removal action approach is the technical approach that will be used to address the release or threat of release and comply with ARARs to the extent practicable. Development of a time-critical removal action approach is analogous to the design step; also by way of analogy, it is a combination of two steps (defining and designing an alternative) of a longer term action (see Submodules 4.3, Preconceptual Design, and 4.5, Conceptual Design). These two steps are combined in a time-critical removal action in order to streamline the response.

Development of the removal action approach will require a design team that typically integrates (if possible) the team that will perform the action.

The general outline of the response action typically is well established by this point (e.g., removal of volatiles from the subsurface by soil vapor extraction). However, the general intent of the action must be refined into an explicit statement of measurable objectives of the action. These objectives will be used for judging the adequacy of the approach and the success of the action.

The three basic approaches for establishing the objectives of a time-critical removal action are ARARs-based, cost/scope-based, and action-based. Any one or any combination of these approaches is acceptable. For example:

- **ARARs-based.** Thorium-contaminated soil will be removed in the top 6 in. of soil to the action level of 5 pCi/g established in the DOE guidelines.

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- **Cost/scope-based.** Beginning with the most contaminated areas in the southwest corner of the fenced area, the hot spots will be stabilized by placement of temporary cover material. The extent of the action is limited to the funding available this fiscal year, not to exceed $250,000.

  Thorium-contaminated soil will be removed in the top 6 in. of soil above 5 pCi/g, until a maximum 500 yd^3 is removed and stored at the interim storage facility.

- **Action-based.** Drums containing strontium-contaminated liquids will be removed, overpacked, and placed in temporary storage.

Key uncertainties and data gaps in the understanding of the site or the site problems can be managed in two ways:

- Collecting additional data that reduce (or perhaps eliminate) the uncertainty

- Developing contingency plans to accommodate the uncertainty if it creates a need to modify the remediation approach in the field

Extensive data collection prior to action generally is not feasible for a time-critical removal action. Examples of limited data collection that may be feasible for a time-critical removal action (i.e., less than 6 months planning) include using rapid turnaround methods to provide quantitative and qualitative information to:

- Reduce uncertainty of contaminated soil volume.

- Provide information meeting waste acceptance criteria.

- Provide information to ensure that worker health and safety will be protected during the action.

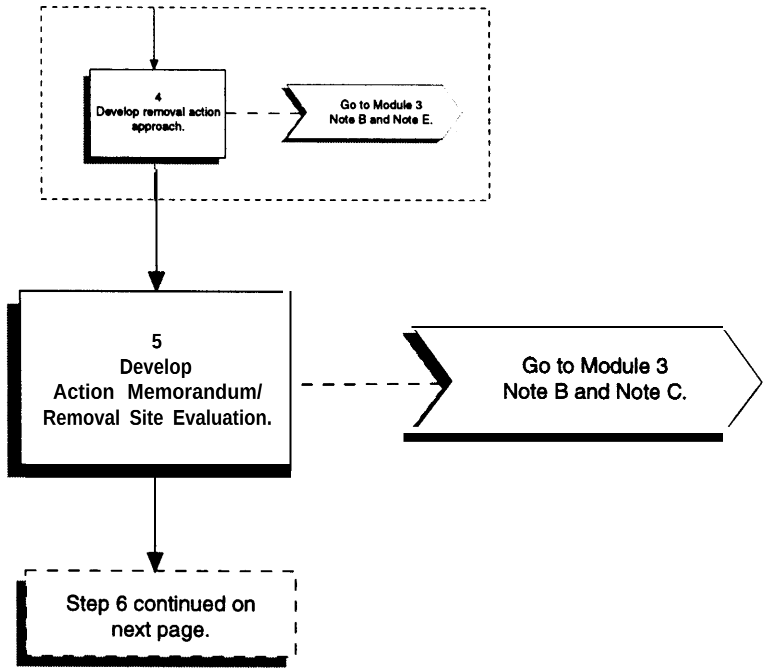
Major uncertainties and data gaps that cannot be managed or addressed using very limited data collection activities generally cannot be tolerated for a time-critical removal action. Any unknowns that render implementation or probable success of the action highly uncertain may require more involved study than is feasible within a 6-month period, and generally, such required study would place the problem outside the scope of a time-critical removal action. If extensive data collection is required to reduce uncertainties or if key uncertainties cannot be resolved through development of contingency and monitoring plans (see Step 4, below), the site problem may be more appropriately addressed through a longer term response (see Module 4, Non-Time-Critical Removal Actions and Early Remedial Actions).

The final removal action approach must ensure the following:

- That all compliance issues can be resolved

- That any uncertainties in the removal action approach are acceptable and can be managed through developing/implementing contingency plans

Module 3 Time-Critical Removal Actions (cont.)



- That logistical issues can be identified before implementing the removal action approach

- That a cost estimate of acceptable accuracy for completing the action is feasible, as based on the detail to which the response has been defined/ designed

- That removal action objectives can be substantially met

The removal action approach should be brief (e.g., less than 10 pages). It should include a description of the approach, an assessment of how it achieves compliance (e.g., removal action objective), and a cost estimate. It will appear in both the removal action Work Plan and the Action Memorandum/Removal Site Evaluation. Module 3, Note B provides an example removal action approach as included in an Action Memorandum. Module 3, Note E provides an example removal action approach from a removal action work plan.

Step 5. **Develop Action Memorandum/Removal Site Evaluation.** The NCP requires that a removal site evaluation be conducted and that an action memorandum be prepared in order to document the basis and intent of undertaking a removal action. To streamline the planning phase, the Removal Site Evaluation and Action Memorandum are written together and incorporated into a single document.

For a removal action, the Removal Site Evaluation fulfills the purposes served by the Remedial Investigation (RI) report and the Feasibility Study (FS) for a Remedial Action. It presents the understanding of the site as based on the available information (e.g., results of site inspection or preliminary assessment) and it explains the possible responses that could be taken (typically focusing on one fairly obvious solution). By presenting a preferred alternative, the Removal Site Evaluation goes one step further than an FS. In the Remedial Action process, this is left to the Proposed Plan. (For more detailed information on the Removal Site Evaluation see Submodules 4.1, Scoping, and 4.6, Remedy Selection and Documentation.)

Given the limited planning time available for a time-critical removal action, the Removal Site Evaluation often is based entirely on available information and does not report the results of any new investigation of the site.

The purposes of the Removal Site Evaluation are:

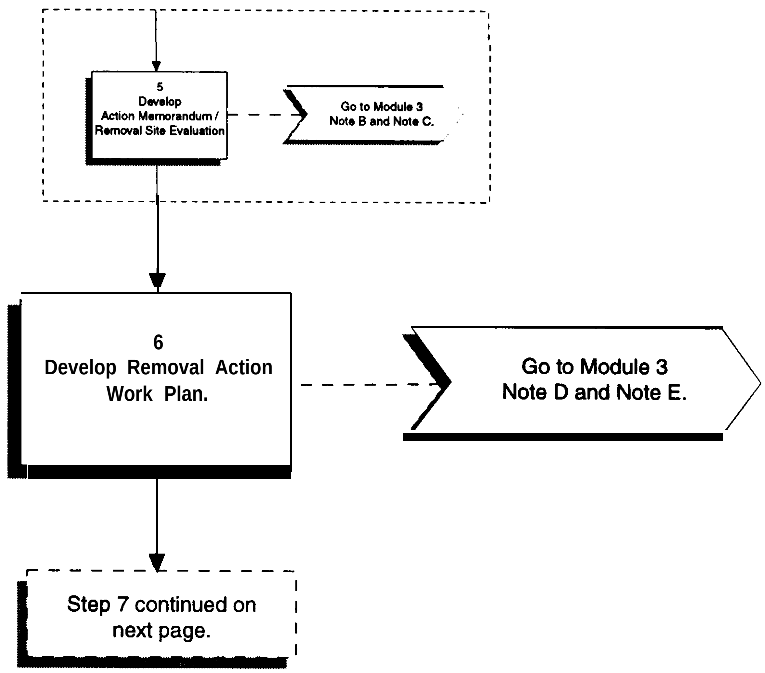
- To assess the site problem(s) addressed by the removal [The conceptual site model (see Step 2, above) is the basis for the assessment.]

- To establish that a removal action is appropriate for addressing the occurrence of a release or the potential for a release

- To document the objective(s) of the removal action

- To identify (briefly) the alternative(s) considered for the removal action and to identify the preferred alternative

Module 3 Time-Critical Removal Actions (cont.)



- To evaluate the preferred alternative for cost, effectiveness, and implementability [The removal action approach (See Step 4, above) is the basis for the evaluation.]

- To present a recommendation to proceed with a removal action

The Removal Site Evaluation also provides the basis for planning a limited data collection through a limited field investigation (LFI) in the removal action work plan (see Step 6, below) if required for addressing key uncertainties before initiation of a time-critical removal.

The following essential elements of the Action Memorandum are presented as the Removal Site Evaluation: (1) identification and description of the site problem(s) to be addressed by the removal (conceptual site model developed in Step 2); (2) evaluation of the urgency of the response (compliance issue addressed in Step 3); (3) identification of the objective of the time-critical removal action; (4) description of the removal approach that will be used to achieve the objective (developed in Step 4).

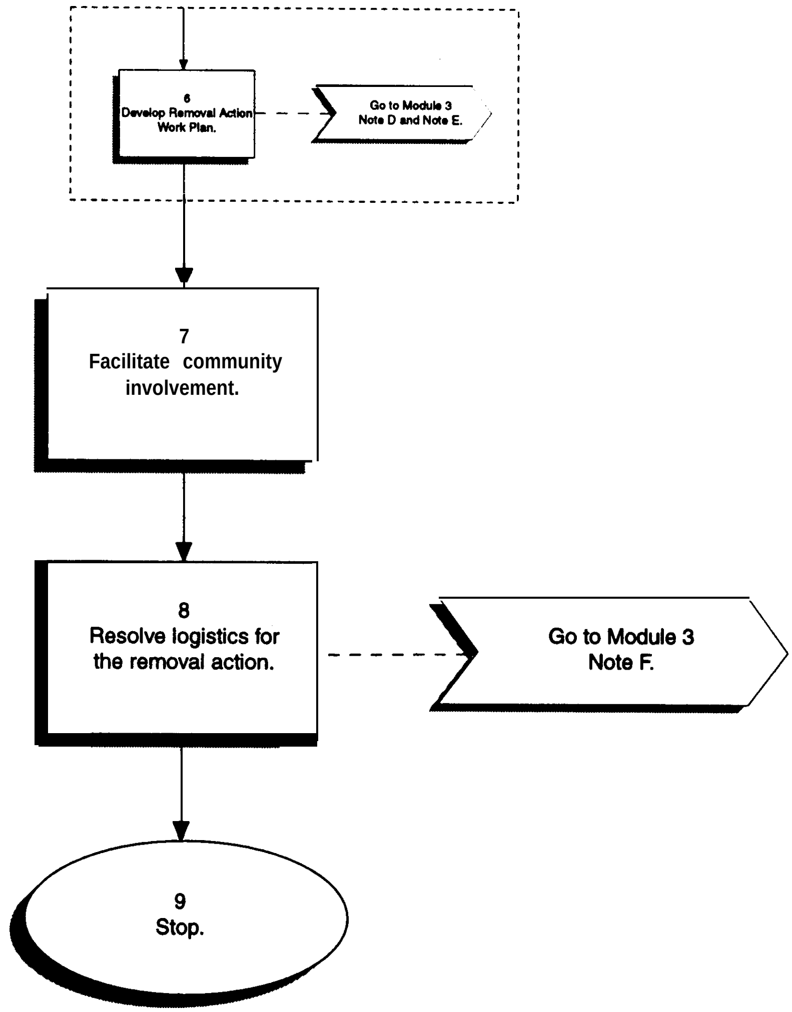
For a removal, the Action Memorandum serves the role of the Record of Decision (ROD) in a remedial action. That is, the Action Memorandum is the document that formalizes the lead agency's decision to undertake a removal action under CERCLA (Section 104) authority. Additional detail on preparing action memoranda is provided in Module 4, Non-Time-Critical Removal Actions and Early Remedial Actions. An example Action Memorandum for a time-critical removal action is provided in Module 3, Note B. The required elements for the Action Memorandum are presented in an example outline in Module 3, Note C, which provides additional detail specific to combined Action Memorandum/Removal Site Evaluations for time-critical removals.

CERCLA statutory limits on removal actions (i.e., 1 year and $2 million) do not apply to DOE removal actions because they are not fund financed (DOE/EPA, 1995). Facility-specific Federal Facilities Agreements (FFAs) should be examined to assess whether the limitations apply.

Step 6. **Develop Removal Action Work Plan.** Once the decision is made to proceed with the removal, a work plan is needed to outline the "who," "what," "when," and "where". The "why" was outlined in the Removal Site Evaluation/Action Memorandum and can be referenced as necessary in the work plan. The Action Memorandum included statements of "what" would be done through the removal, but those statements are necessarily somewhat general and do not provide sufficient detail for actual implementation of the removal. The work plan outlines the detailed steps for implementing the removal. For a time-critical removal action, the work plan combines the purposes of the work plan for a longer term early action (see Submodule 4.1, Scoping) and the design for the removal. (Although final design is beyond the scope of this guidance document, Submodules 4.3, Preconceptual Design and 4.5, Conceptual Design provide guidance on the early steps of design for a removal.)

The work plan complements the Action Memorandum, carrying the development of the removal approach to a fully implementable plan. The work plan must provide the following:

Module 3 Time-Critical Removal Actions (cont.)



- Complete design for the removal action

- Procedures for the removal action incorporated as the following appendices: (l) Quality Assurance Project Plan, (2) Health and Safety Plan; (3) Sampling and Analysis Plan (SAP); and (4) Waste Management Plan

- Management Plan. This should include the schedule, cost estimates, organization chart (with roles and responsibilities), and a procurement plan, if required.

To the extent possible, existing plans or standard procedures should be referenced or adopted in order to avoid developing the plans from scratch. For example, facility decommissioning procedures may have a pre-approved SAP for meeting waste acceptance criteria. Module 3, Notes D and E provide an example outline and sections of a work plan for a time-critical removal action at a DOE site.

Step 7. **Facilitate community involvement.** For a typical time-critical removal action, the limited time available before the action must commence means that the facility will not have opportunity to provide for public participation before initiating action. Instead, community involvement is usually arranged concurrent with the action. The NCP requires that DOE

- Publish a notice of availability of the Administrative Record in a major local newspaper of general circulation within 60 days of initiation of onsite activity.

- Provide a public comment period as appropriate of not less than 30 days from the time the Administrative Record file is made available to the public for inspection.

- Prepare a written response to significant written comments.

In all instances, the DOE facility should involve the public as soon as time allows. For example, if time is available, a draft of the Action Memorandum might be released to the public for comment prior to initiating action.

Step 8. **Resolve logistics for the removal action.** Once the Action Memorandum is signed and the action is designed, implementation should be all that remains. Numerous logistical issues have to be resolved prior to and during mobilization. This step falls under implementation of the removal action and is therefore outside the scope of this guidance document. However, as partial guidance, Module 3, Note F provides a detailed checklist of logistic issues with discussions of the importance of each.

Step 9. Stop.

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Note A. **Example Conceptual Model for a Time-Critical Removal Action at Mound.**

The following is an example conceptual model excerpted from a removal action work plan at the Mound Plant. Module 3, Note E provides another excerpt from the same work plan and additional detail on the specific action.

The purpose of this example is to illustrate the development of a conceptual model that focuses on a single site problem rather than on a conceptual site model as described in DOE's RI/FS guidance, in which the model provides a summary of all site problems in an operable unit.

This conceptual model was used to provide the basis for the design of the removal action for the expected conditions and for an uncertainty analysis conducted as part of the design basis. These are illustrated in Module 3, Note E.

The development of the conceptual model and expected conditions was the focus of several meetings between DOE, its contractor, and subcontractor. The brevity of the conceptual model illustrates the effort of the project team in concisely summarizing relevant information for use as a design tool.

actinium-227, 1,400 pCi/g, occurred at a depth of approximately 12 feet, although contamination was measured at other locations at depths between approximately 6 feet and 20 feet. It is assumed, however, that subsurface contamination extends to a depth of 23 feet. The asphalt and concrete surfaces are not expected to be contaminated. Samples from boreholes C-008 and C-009 exhibited maximum radium-226 concentrations of 2.0 pCi/g. Results from B-16 sample analysis show a thorium-232 concentration of 25 pCi/g at a depth of 4-6 feet. Thorium-232 contamination is expected to be encountered from the soil surface to a depth of 6 feet. Although not reported in the results from boreholes C-008, C-009, and B 16, thorium-228 is reported to have been deposited with the actinium-contaminated soil.

Previous field sampling helps establish expected conditions.

A review of historical information indicates that no transuranic wastes are present and no hazardous materials are present above regulatory levels. Also, based on the background information presented in Section 1.3, the actinium-227 contamination is concentrated around the former septic tank rather than being dispersed throughout the subsurface region.

Process information helps establish expected conditions.

Soil gas surveys were performed in Area 7 in 1992 (DOE 1992a). Each sample was collected at a depth of five feet. Of a total of 53 samples collected from Area 7, two were from locations within the removal action control zone. Total VOC's detected at these locations were 39 ppb and 13 ppb. At the former location, the total consisted entirely of Freon-113. These results are consistent with the observations from B-16 (Appendix A) in which 8-10 ppm was measured by the OVA at the borehole surface when the split spoon sample from the 4-6 feet depth was extracted from the borehole. For the proposed depth of the removal action, B-16 drilling measurements indicate the highest OVA readings occurred at 18 feet BGS (200 ppm) and 24 feet BGS (900 ppm).

2.2.2. **Subsurface Material**

The subsurface conditions in the area of the suspected septic tank were obtained from the B-16 and B-3 boring logs. Figure 2.2. shows the strata to a depth of 52 feet. The subsurface material consists of silty sand and gravel in the upper ten feet and between 16 feet and 20 feet. Clay is found between 10 and 16 feet and from 20 feet to 40 feet. It is assumed that any debris encountered during the excavation will comply with Mound Waste Stream AMDM-000000012 (WS12) criteria as defined in manual WD-10332

Expected site conditions.

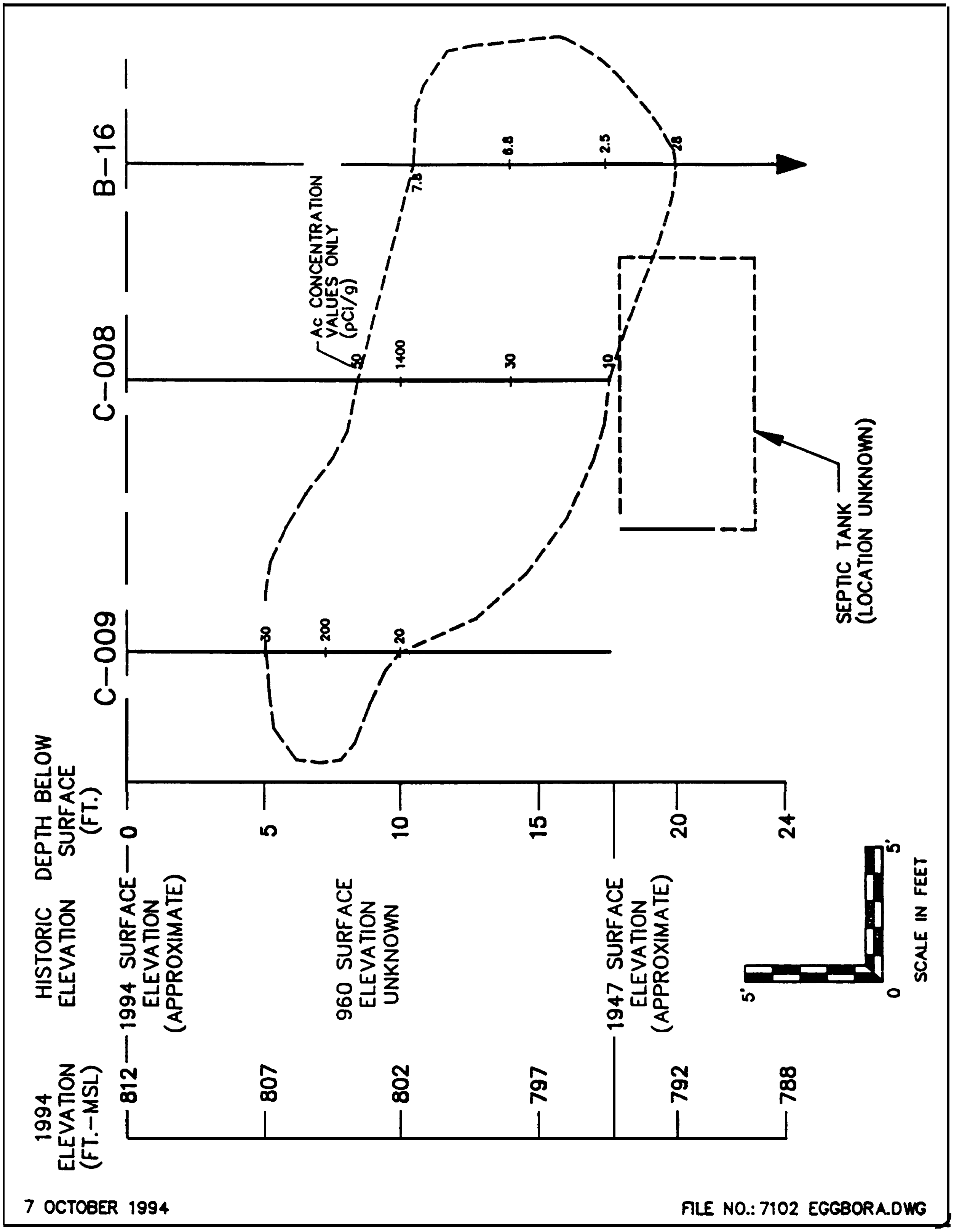

Figure 2.1. Conceptual Model

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Expected site conditions.

2.2.3. **Groundwater**

As shown in Figure 2.2., groundwater was encountered in borings B-16 and B-3 at 17 feet BGS in a silty sandy gravel strata. Based on available information and discussion with the Mound Hydrogeologist, it is assumed that this represents a perched water zone and that the underlying clay strata acts as an aquitard. Based on the depth to groundwater, the top of the confining clay layer at 21 feet, and the assumption that the perched water zone is laterally discontinuous, it is estimated that recharge rates to the aquifer range from 10,000 to 20,000 gallons per day (gpd) and that the reservoir contains approximately 360,000 gallons. No groundwater contamination has been detected in the vicinity of the removal action.

Assumptions help define expected conditions.

2.2.4 **Septic Tank**

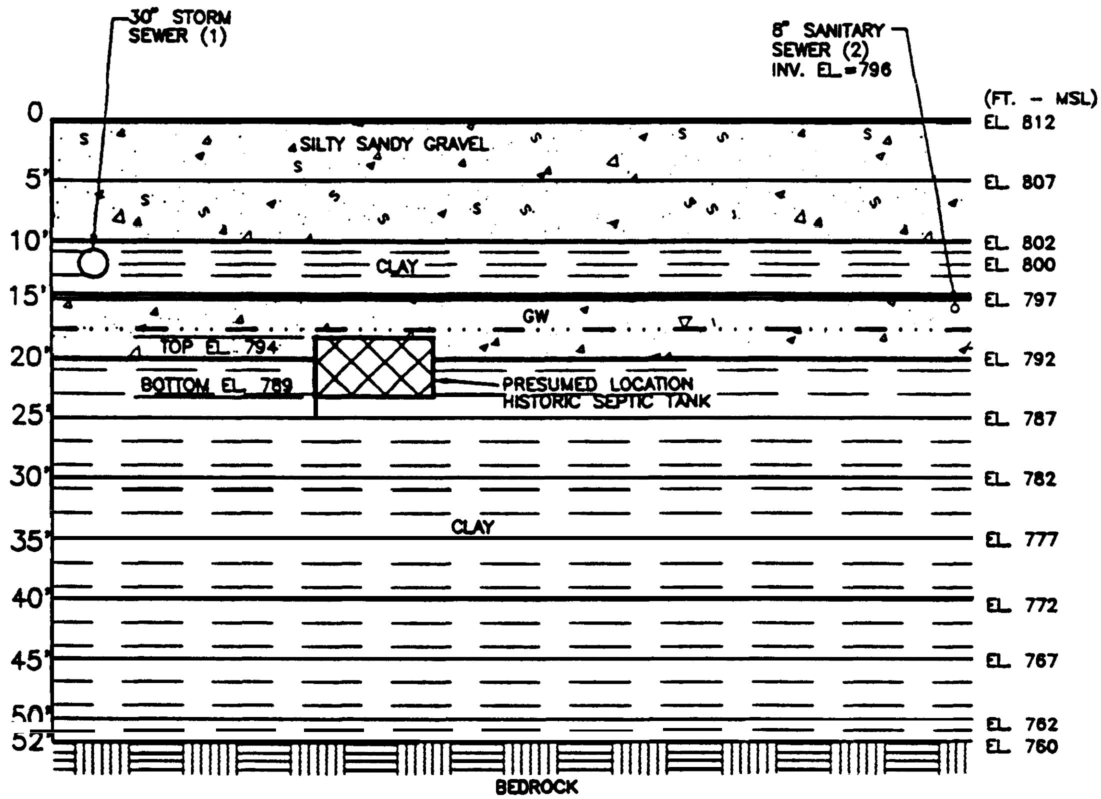
The septic tank is reported to have been installed at or near the surface of the original ravine in the late 1940's. The tank is assumed to be a 1,500 to 2,000 gallon concrete tank with nominal dimensions of 5 ft x 5 ft x 10 ft. Based on existing contours, the top of the tank is expected to be about 18 feet BGS and the base of the tank about 23 feet BGS.

Assumption.

2.3. **PROBLEM STATEMENT**

The problem, as defined by this removal action, is the presence of soils contaminated with actinium-227, thorium-228/232 and radium-226 above clean-up levels within a pre-determined volume in the northern portion of Area 7. The potential release of this contamination to area groundwater constitutes a threat to both on-site workers and possibly the off-site environment.

The site problem defined on the basis of the conceptual model and expected conditions.



NOTES:

(1) 30" STORM SEWER CONSTRUCTED OF REINFORCED CONCRETE PIPE (RCP).

(2) 8" SANITARY SEWER CONSTRUCTED OF VITRIFIED CLAY PIPE (VCP).

(3) IDEALIZED STRATIGRAPHY BASED ON B-3 AND B-16 BORING LOGS.

HORIZONTAL DISTANCE NOT TO SCALE

25 OCTOBER 1994

FILE NO.: 7102 EGGXB.DW

Figure 2.2. Conceptual Site Stratigraphy

OU5, Area 7 Removal Action Work Plan
October 1994

Note B. **Action Memorandum for a Time-Critical Removal Action at Idaho National Engineering Laboratory.**

The following Action Memorandum provides an example of the extent to which a decision document can be focused for a time-critical removal action. This removal action was initiated at INEL to remove sludge from a former chemical processing plant. The action memorandum was issued and the action has since been completed.

Elements of this action are:

- The majority of the design and actual implementation information has been left to other documents (e.g., removal/action work plan, field procedures). This allows the action memorandum to be brief and focused on the specific site problem and resolution that has been determined.

- The action memorandum is consistent with EPA's suggested outline (EPA, 1990) for non-time-critical removal actions.

- The action memorandum, while issued by DOE as the lead agency, received regulatory consensus prior to its issuance.

DEPARTMENT OF ENERGY
IDAHO FIELD OPERATIONS OFFICE
LEAD AGENCY ACTION MEMORANDUM
REMOVAL ACTION - IDAHO CHEMICAL PROCESSING PLANT

SUBJECT: Action Memorandum for a Removal Action at the Idaho Chemical Processing Plant, Waste Area Group 3, Operable Unit No. 9, CPP-740 Settling Basin, Idaho National Engineering Laboratory, Butte County, Idaho.

I. PURPOSE

The purpose of this action memorandum is to document approval of the proposed removal action described herein for Idaho Chemical Processing Plant (CPP)-740 settling basin site, Idaho National Engineering Laboratory, Butte County, Idaho.

II. **SITE CONDITIONS AND BACKGROUND**

This is a time-critical removal. The site consists of a concrete settling basin and tank containing some 2,700 gallons of sludge and approximately 4,600 gallons of water, both which are radioactively contaminated. The settling basin was constructed in 1962 and abandoned in 1977. Because of the site conditions, age of this facility and the liquid nature of the contamination, an action is warranted.

Expected conditions.

A. SITE DESCRIPTION

1. REMOVAL SITE EVALUATION

Removal Site Evaluation is integrated into the Action Memorandum.

The site's key problem area includes a concrete settling basin constructed in 1962 containing some **2,700** gallons of sludge and 4,600 gallons of water, both of which are radioactively contaminated. (Radioactive waste characterization of CCPP-603 Basin System, CPP-740, Technical Report WM-Fl-81-023, Revision 1.)

Site problem identified.

Both a preliminary assessment and site inspection were completed as part of a Value Engineering Session held March 15-16, 1993. Because of the age of the structures (1962 construction period), there is a potential threat of release to the environment of this radioactively contaminated media.

2. PHYSICAL LOCATION The CPP began operations in 1953 as a facility for receipt, interim storage, and reprocessing of nuclear materials, such as irradiated nuclear fuel from test, defense, and research reactors in the United States and other countries. The plant is located at the Idaho National Engineering Laboratory (INEL), about 45 miles west of Idaho Falls, Idaho. There are no residents within an 11-mile radius of the site and a very low density within a 32-mile radius. 3. **SITE CHARACTERISTICS** The Fuel Receiving and Storage Facility (CPP-603) is located at the south end of the CPP. Prior to reprocessing, spent fuel assemblies are stored at the basin area until a sufficient amount of fuel is accumulated for a reprocessing run. The basins are filled with water with approximately 20 ft of cover of the fuel assemblies to provide radiation shielding. With the construction of this facility, a filtration system was installed to maintain the visibility of the water. This system consisted of a diatomaceous earth filter. The filter was back washed periodically when a pressure drop occurred. The backwash slurry of filter aid material and backwash water was then pumped to CPP-301, a vertical concrete settling basin. When the slurry settled, the supernatant was then drained from the settling pit to a dry well. The settling period usually required the slurry to settle overnight, hence holding up back washing. It was for this reason that in 1962 the horizontal settling basin (CPP-740) was constructed. The use of the CPP-740 settling facilities was terminated in early 1977 when a system of pressurized solid filter replaced this system. This site is owned by the federal government. This is the first removal action at this site, but one of three sites planned for a removal action at WAG 3.	**Process information.**

4. **RELEASE OR THREATENED RELEASE INTO THE ENVIRONMENT OF A HAZARDOUS SUBSTANCE, OR POLLUTANT OR CONTAMINANT**

Because of the age of this settling facility and the liquid nature of the contamination this facility poses a threat of release to the environment, including soils.

Basis for using removal action/CERCLA 104 Authority to respond to site problem.

The materials known to be on-site consist of radioactively contaminated liquid and sludge and include Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances under CERCLA Section 101(14).

Total volume of hazardous substances is estimated to be 2,700 gallons of radioactively contaminated sludge and 4,600 gallons of radioactively contaminated liquid.

5. **NATIONAL PRIORITIES LIST (NPL) SITE STATUS**

The Idaho Chemical Processing Plant is a Waste Area Group (WAG 3) and is located within the boundaries of the designated INEL NPL site. No remedial activities are in progress at the CPP. No remedial actions are proposed at this time.

6. **LOCATION MAPS**

Figure 1-1 shows the location of the site with respect to the INEL. Figure 1-2 shows the site location with respect to southeastern Idaho. Figure 1-3 shows the location of the horizontal settling basin (CPP-704) and its location relative to the Fuel Receiving and Storage Facility (CPP-603).

B. OTHER ACTIONS TO DATE

There are no actions to date by the U.S. Department of Energy-Idaho Field Operations (DOE-ID) on this site. No current remedial actions are under way on this site.

C. STATE AND LOCAL AUTHORITIES' ROLE

The Idaho Department of Health and Welfare has been notified of actions at this site. The DOE-ID will be the lead agency for this removal action.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Conditions presently exist at the site which, if not addressed by implementing the response action plan, may present a substantial endangerment to the environment. Conditions at the site meet the criteria for a removal action as stated in the National Contingency Plan (NCP), 40 CFR Section 300.415:

Listing of specific reasons this response meets criteria listed in NCP for using removal (CERCLA 104) authority.

A. THREATS TO THE ENVIRONMENT

1. Hazardous substances or pollutants or contaminants in drums. barrels, tanks or other bulk storage containers that may pose a threat of release, 40 CFR 300.415 (b) (2) (iii) – The settling basin was constructed in 1962 and its present physical condition is not known, however, given the age of the facility and the liquid nature of the radioactive contamination, action needs to be taken to prevent threat of a release to the environment.

2. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released, 40 CFR 300.415 (b) (2) (v) – The top of the settling basin is not sealed and precipitation or run off from other sources could enter the basin, causing an overflow of subsequent contamination of soils.

IV. ENDANGERMENT ASSESSMENT

Threatened release of hazardous substances from this site, if not addressed by implementing the response action selected in this memorandum, may present an endangerment to the environment.

Required endangerment assessment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

The proposed removal action consists of on-site pumping of the sludge and the liquid, solidification of the sludge and off-site disposal at the Radioactive Waste Management Complex (RWMC). The RWMC facility, located several miles west of the ICPP, receives

Removal action approach.

low level radioactive waste for storage. Radioactive wastes are transferred and stored in approved containers and must meet acceptance criteria for LLW before being stored at this facility. The RWMC manages this waste to meet State and EPA requirements.

The radioactively contaminated liquid would be treated at the Process Equipment Waste (PEW) Facility. The PEW treats wastes containing radioactive constituents from various processes at the ICPP. Liquid wastes are evaporated to concentrate radioactive fractions which are then transferred to a permitted storage tank facility. These high level liquid wastes are then calcined at the Waste Calcine Facility to reduce their volume and mobility. This action was selected based on the following factors:

1. Pumping of the sludge and liquid is the most effective action to prevent and eliminate the threat of release to the environment.

2. A technology is available for the solidification of the radioactively contaminated waste.

3. On-site disposal at the RWMC, and the processing of the liquid at the PEW is readily available, requiring a minimum of handling and transport.

A. PROPOSED ACTION

Soil covering the settling basin, approximately 7 ft, will be excavated for access to the basin. The sludge and liquid will be removed and disposed of as discussed in Section V above.

1. CONTRIBUTION TO REMEDIAL PERFORMANCE

This removal action would contribute to the efficient performance of any long-term remedial action by: (1) addressing the threat of a release that requires attention to stabilize that site to protect the environment of a release of some 7,300 gallons of radioactively contaminated sludge and liquid until a long term-remedy can be implemented;
(2) preventing a potential of further migration to the environment of radioactively contaminated media; and (3) not hindering or foreclosing viable options for long-term remediation.

Relation to long-term actions at site.

2. DESCRIPTION OF ALTERNATIVE TECHNOLOGIES	
No other alternate technologies were considered given that the sludge can be solidified and disposed of at the RWMC, and the liquid waste can be handled on-site at the PEW.	**Focused alternative assessment.**
3. **ENGINEERING EVALUATION/COST ANALYSIS**	
This applies only to non-time critical responses. This is a time-critical response.	
4. **APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARAR)**	**ARARs assessment.**
FEDERAL ARAR'S	
Regulations under 10 CFR 61 would be "relevant and appropriate" for disposal at the RWMC.	
STATE ARAR'S	
No standards or regulations would be considered as ARAR's for this removal action. Calcining of the radioactive waste would fall under the requirements of the Idaho air regulations.	
5. **PROJECT SCHEDULE**	
Planning for this response action is currently under way, and it is expected that field activities will begin in July or August and be completed by mid-November 1993.	
B. **ESTIMATED COSTS**	
The estimated cost to accomplish the cleanup would be $1,100,000.	
IV. **EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN**	
Delayed action would increase the risk that a release of radioactively contaminated material would occur.	
VII. **OUTSTANDING POLICY ISSUES**	
None	

VIII. ENFORCEMENT

DOE/ID is conducting this response action under their authority as a "lead agency" under 40 CFR 300.5 and .415 (b) (l).

IX. RECOMMENDATION

This decision document represents the selected removal action for the CPP-740 Settling Basin site, in Butte County, Idaho, developed in accordance with CERCLA as amended, and not inconsistent with the NCP.

Conditions at this site meet the NCP Section 300.415 (b) (2) criteria for a removal; and this action was approved by DOE/ID on April 6, 1993 at a Baseline Change Proposal meeting on April 6, 1993 (see attached approved Baseline Change Proposal 93-22). The total project costs are estimated at $1,100,000. The funding for this project is being provided by DOE/ID.

Vote C. Example Outline for an Action Memorandum: Time-Critical Removal Action.

I. **Purpose**

II. Site conditions and background
- A. Site description
  1. Removal site evaluation
  2. Physical location
  3. Site characteristics
  4. Release or threatened release into the environment of a hazardous substance, pollutant, or contaminant
  5. NPL status
  6. Maps, pictures, and other graphics representation
- B. Other actions
  1. Previous actions
  2. Current actions
  3. Consistency with final actions
- C. State and local authority roles
  1. State and local actions to date
  2. Potential for continued state/local response

III. Threats to public health or welfare or the environment, and statutory and regulatory authorities
- A. Threat to public health or welfare
- B. Threats to the environment

IV. Determination of endangerment

V. Proposed actions and estimated costs
- A. Proposed actions
  1. Proposed action description
  2. Contribution to remedial performance
  3. Description of alternative technologies
  4. ARARs
  5. Project schedule
- B. Estimated costs

VI. Expected change in the situation if action is delayed or not taken

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Note D. **Example Outline of Removal Action Work Plan.**

1. Introduction
   - 1.1 Purpose
   - 1.2 Work plan format
   - 1.3 Background
   - 1.4 Objectives
   - 1.5 Action Memorandum/Removal Site Evaluation

2. Conceptual model
   - 2.1 Available data
   - 2.2 Expected conditions
   - 2.3 Problem statement

3. Design basis
   - 3.1 Applicable or relevant and appropriate requirements
   - 3.2 Other standards and requirements
   - 3.3 Removal action guidelines
   - 3.4 Design methodology

4. Removal action activities
   - 4.1 Additional site characterization
   - 4.2 Mobilization
   - 4.3 Site preparation
   - 4.4 Implementation

5. Site closure demobilization
   - 5.1 Investigative derived material disposal
   - 5.2 Site restoration

6. Schedule

7. Cost estimate

8. Project organization

Appendices

- A Sampling and Analysis Plan (i.e., a Field Sampling Plan and Quality Assurance Project Plan)
- Health and Safety Plans (required under 29 CFR 1910.120 and 40 CFR 300. 150)
- A construction quality assurance plan
- Integration of activities with the facility Community Relations Plan
- Procedures for dealing with unexpected occurrences
- Progress reporting
- Demonstration of completion

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Note E. **Example Design Basis for a Time-Critical Removal Action at Mound.**

This removal action design basis provides an example of how to design an action to meet a set of expected site conditions, while acknowledging uncertainties and preparing to manage uncertainty in the field.

The Operable Unit (OU) 5, Area 7, Actinium-Contaminated Soil Removal Action Work Plan, from which this design basis has been extracted, provides the operating procedures for performing a time-critical removal action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for a portion of Area 7 within OU5 suspected of containing actinium-227 contaminated soils in and around a buried septic tank.

Area 7 is located in the northern portion of Mound OU 5 in the vicinity of buildings 29, 51, 66, and 98, and is approximately 700 ft by 200 ft in size. Originally a steep ravine, Area 7 historically received backfill material and debris. A septic tank, installed in the northern end of Area 7 during the construction of the Mound site in the late 1940s, was abandoned at the time site operations began. In 1959 or 1960, soil, concrete, and gravel contaminated with actinium-227, radium-226, and thorium-232 from the SW building were buried in and/or near the abandoned septic tank. Subsequently, the area in the vicinity of the tank was backfilled to level the ravine. In 1984, a parking lot was built over the backfill adjacent to Buildings 29 and 98.

This work plan was based on detailed discussions with EG&G Mound Environmental Restoration (ER) and Decontamination and Decommissioning (D&D) personnel. A conceptual model was prepared detailing the conditions expected to be encountered at the site, including nature, location, and extent of contamination. The work plan strategy, developed using the Streamlined Approach For Environmental Restoration (SAFER), provides contingency plans in the event that actual site conditions vary from the expected site conditions. A design basis was established for excavation, temporary storage, waste management, and disposal of contaminated soils for the removal action in Area 7.

3. DESIGN BASIS

This section includes information necessary to serve as a basis of design for the removal action. Specifically, this section presents regulations that are considered practicable for a removal action, Mound and DOE policies and procedures, removal action guidelines, the design methodology, and the design flow diagrams. Each of these items is addressed in the following sub-sections.

3.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Mound OU5 applicable or relevant and appropriate requirements (ARARs) for the ER Program Remedial Investigation/Feasibility Study (RI/FS) project have been identified (DOE, 1993b). CERCLA regulations require that removal actions comply with ARARs only to the extent practicable.

ARARs **are a part of the design basis: they may provide necessary performance requirements or specifications.**

Only those ARARs that relate to the actual removal action and not to long-term remediation, apply to the removal. The following ARARs are federal and state requirements that are considered practicable for this removal action.

3.1.1. <u>Air Qualitv</u>

- **§40** C.F.R. Part 61 Subpart H: National Emissions Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities.
- Ohio Administrative Code (0. A. C.) 3745- 15-07(A): Air Pollution Nuisances Prohibited
- O.A.C. 3745 -17-02(A,B,C): Particulate Ambient Air Quality Standards
- O.A.C. 3745-17-05: Particulate Non-Degradation Policy
- O.A.C. 3745-17-08 (A)(l), (A)(2), (B), (D): Emission Restrictions for Fugitive Dust

3.1.2. <u>Worker Safetv</u>

- §29 C.F.R. Part 1910: Occupational Safety and Health Act (OSHA) –General Industry Standards
- §29 C.F.R. Part 1926: OSHA–Safety and Health Standards

- §29 C.F.R. Part 1904: OSHA –Recordkeeping, Reporting, and Related Regulations

3.2 **OTHER STANDARDS AND REQUIREMENTS**

The following is a list of other standards and requirements applicable to this removal action.

3.2.1 **Mound Manuals and Procedures**

Internal facility requirements contribute to design basis.

Mound manuals and procedures applicable to this removal action include:

- Quality Policy and Responsibilities (MD-10334)
- Quality Assurance Program for Engineering Dept. (MD-10241)
- Standards and Calibration System (MD- 1OO96)
- Safety and Hygiene Manual (MD-10286)
- Radiological Protection Program Manual (MD-1OO19)
- D&D Field Coordinator Manual (MD-10167)
- Low-level Waste Management Manual (MD-81240)
- General Procedures for Calibration of Radiation Protection Instrumentation (MD-10215)
- Waste Certification Program Plan (MD-8102O)
- D&D Decontamination Procedures (MD-10332)
- Form ML-7588 Engineering Review Transmittal Sheet

  Form ML-8440 Project Quality Assurance Review

  Form ML-8816 Engineering Department Non Conformance Report
- Health Physics Procedures (MD-80036)

- Work Package Development Manual, Decontamination and Decommissioning – Mound, 1992
- Quality Assurance Plan for Decontamination and Decommissioning Project Management (MD-10241)
- Debris Disposal (WS12)
- Environmental Restoration Procedures (OU9 RI/FS QAPjP)

3.2.2. **DOE Orders/Criteria**

The following list of DOE Orders and criteria are applicable to this removal action:

DOE orders contribute performance requirements or specifications to design basis.

- Radiation Protection for the Public and the Environment (5400.5)
- Radioactive Waste Management (5820.2A)
- Project Management System (4700.1)
- Radiation Protection for Workers (5480.11)
- Nevada Test Site (NTS) Waste Acceptance Criteria (NVO-325)

3.3. REMOVAL ACTION GUIDELINES

3.3.1. Actinium

There is currently no EPA clean-up standard for actinium-contaminated soil. Although no baseline risk assessments have been completed for OU5, Area 7 at this time, a risk analysis has been performed for actinium-contaminated soils at another location at Mound. For that project, the clean-up standard for actinium-227 was based on a risk model incorporating a residual radioactive material program (RESRAD) that took into account sources, release mechanisms, exposure pathways, and receptors. For that analysis, the following model assumptions were made:

Precedent for cleanup level for actinium. The cleanup level becomes a performance requirement in the design basis.

- Pathways: external radiation, dust inhalation, groundwater ingestion, soil ingestion, and radon.

- Exposure parameters: 30-yr. exposure, 2,000 hrs./yr. on-site, 80% thereof indoors, 20% thereof outdoors.

- Fraction of drinking water from on-site groundwater = 0.23.

Based on these assumptions, a concentration of 5 pCi/g of actinium-227 resulted in a dose of less than 10 mrem and a corresponding lifetime cancer risk of 2.5 x 10^{-5} Pending further assessments, this concentration will be used as the actinium-227 clean-up goal for this removal action.

3.3.2. Thorium and Radium

Per DOE Order 5400.5, the clean up criteria for thorium and radium are 5 pCi/g within 15 cm of the surface and 15 pCi/g at depths greater than 15 cm.

3.4. **DESIGN METHODOLOGY**

The removal action design is composed of three main tasks: excavation, temporary storage, and waste management/disposal. Included in the design methodology for each of these tasks is a description of the expected approach, an uncertainty analysis of the expected conditions and potential deviations, and the monitoring and sampling strategy.

Primary tasks.

The design methodology is a synthesis whereby the expected conditions and design assumptions are initially formed into an expected approach, which is basically a "nothing will go wrong" design strategy. The expected approach is then analyzed to determine all credible deviations from that approach. There is, however, some uncertainty associated with these expected conditions. Uncertainties are attributed primarily to the subsurface conditions not being completely characterized, lack of detailed records as to the location of the septic tank and the deposit of actinium-contaminated soil, and the impacts of changing weather conditions.

Discussion of how uncertainty is managed in this design.

Expected conditions.

To manage these uncertainties, an analysis is conducted to determine the extent to which uncertainties need to be included in the removal action design. The uncertainty analysis starts by listing the expected conditions (extracted from the conceptual model) that are anticipated to be encountered during the removal action. Potential deviations are identified for each expected condition. The type of monitoring or sampling required to confirm if the deviation exists is developed. Contingency plans are developed and presented for the potential deviations to provide guidance on options for redirecting the technical approach. An evaluation of the probability of the deviation occurring is conducted in order to rate the impact of the deviation.

Uncertainties.

Monitoring.

Contingency plans.

Along with the expected approach, the contingency plans for the potential deviations that have a medium or high probability of occurring are included in the removal action design as credible contingencies. Low probability deviations will only be included in the design as contingency plans to be invoked should the unexpected deviation occur.

Note that the deviations were evaluated for probability of occurrence and impact.

The final design is developed as a series of flow diagrams (Section 3.5) in which the expected conditions and all credible contingencies are included.

3.4.1. <u>Excavation</u>

The excavation task and work directly associated with the excavation approach will be performed within the control zone, as defined in the HSP. Features of the control zone include the excavation, box staging during loading, work trailer, contaminated equipment storage, asphalt and concrete debris and the decontamination area.

Presented in the following subsections is a description of the expected excavation approach, the excavation uncertainty analysis, and the resulting monitoring/sampling strategy.

3.4.1.1. Expected Approach

The excavation approach for the removal action is designed to center the excavation, using available information, in the area of the highest concentration of actinium-contaminated soil. It is assumed that the highest concentration of actinium is located in the vicinity of the buried septic tank. However, as previously discussed, the location of the tank can not be confirmed by available information. Elevated levels of actinium have been detected in the soil in an area close to the suspected septic tank location (Figure 2.1), Consequently, the excavation will be focused on this area of known contamination which, for purposes of this removal action, is assumed to be over a 20 ft x 20 ft area. The excavation will extend down to a maximum depth of 23 ft below ground surface (BGS) which corresponds to the expected depth of the septic tank.

Expected conditions.

The expected approach for the removal action excavation will include:

- installation of a dewatering system;
- removal of asphalt and concrete;
- sloped excavation to a depth of 6 feet;
- installation of shoring;

- excavation an additional 17 feet in a 20 ft x 20 ft area; and,
- backfilling.

A 58 ft by 48 ft area will be the footprint for excavation. This area is based on having a sufficient working elevation for the 20 ft x20ft excavation, plus a sloped excavation from the surface to the working elevation. The 58 ft x 48 ft area will have the shortest sides parallel to the 30 inch storm sewer and the 20 ft x 20 ft area will be centered over the pocket of actinium contamination. The asphalt, concrete and sod surfaces will be removed from an area extending slightly beyond the 58 ft by 48 ft boundary. The control zone shall also have a soil liner for temporary stockpile of excavated asphalt/concrete debris. It may be necessary to screen the soils for construction materials or any other debris that could damage the stockpile liner. A continuous berm will be constructed around the stockpile perimeter to prevent contact with surface runoff.

If the asphalt/concrete stockpile debris in the control zone is contaminated, it will be placed in LSA boxes. To comply with off-site disposal criteria, the contaminated asphalt/concrete shall only be placed in the bottom (lower 6 inches) of the LSA boxes. The upper portion of the LSA boxes may be used for excavated soil. Consequently, several boxes may be required to remove all contaminated asphalt/concrete debris. Uncontaminated asphalt/concrete will be transferred to the Mound Spoils Area.

For the first six feet of excavation (approximately 450 cu yd), the soil removal will progress with side slopes (horizontal: vertical) of 1.5: 1 to provide a bench for equipment to excavate the remaining 17 feet. A 20 ft by 20 ft area will be marked off at the toe to the north slope leaving a 10 foot bench on the east, west and south sides. This area will be excavated vertically to a depth of 17 feet (approximately 250 cu yd) to remove the localized pocket of actinium contamination. Sheet piling with cross braces will be designed and installed to support the excavation. Figures 3.1. and 3.2. show the site plan for the proposed excavation and a profile of the excavation with the overall shoring support concept. Until the final excavation support design has been completed, the excavation design in this work plan is subject to change, to be consistent with the shoring design.

The project work will in all cases comply with OSHA requirements in general and will comply with OSHA excavation requirements (29 CFR1926.652) in particular including required sloping and shoring techniques. For the oil conditions expected, the project area has been classed as “C”, which allows a maximum unsupported slope of 1.5:1.

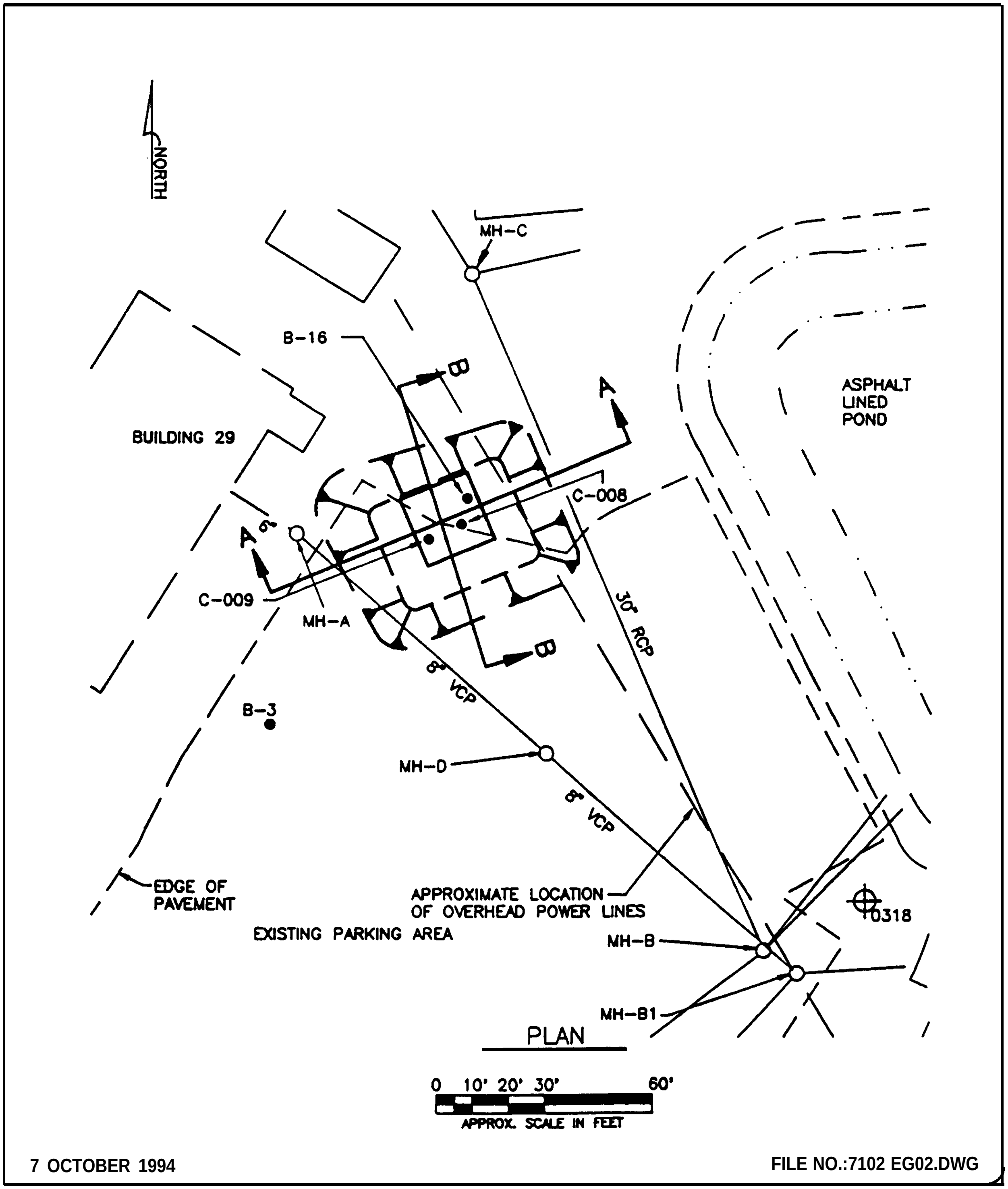

Figure 3.1. Excavation Site Plan

OU5, Area 7 Removal Action Work Plan
October 1994

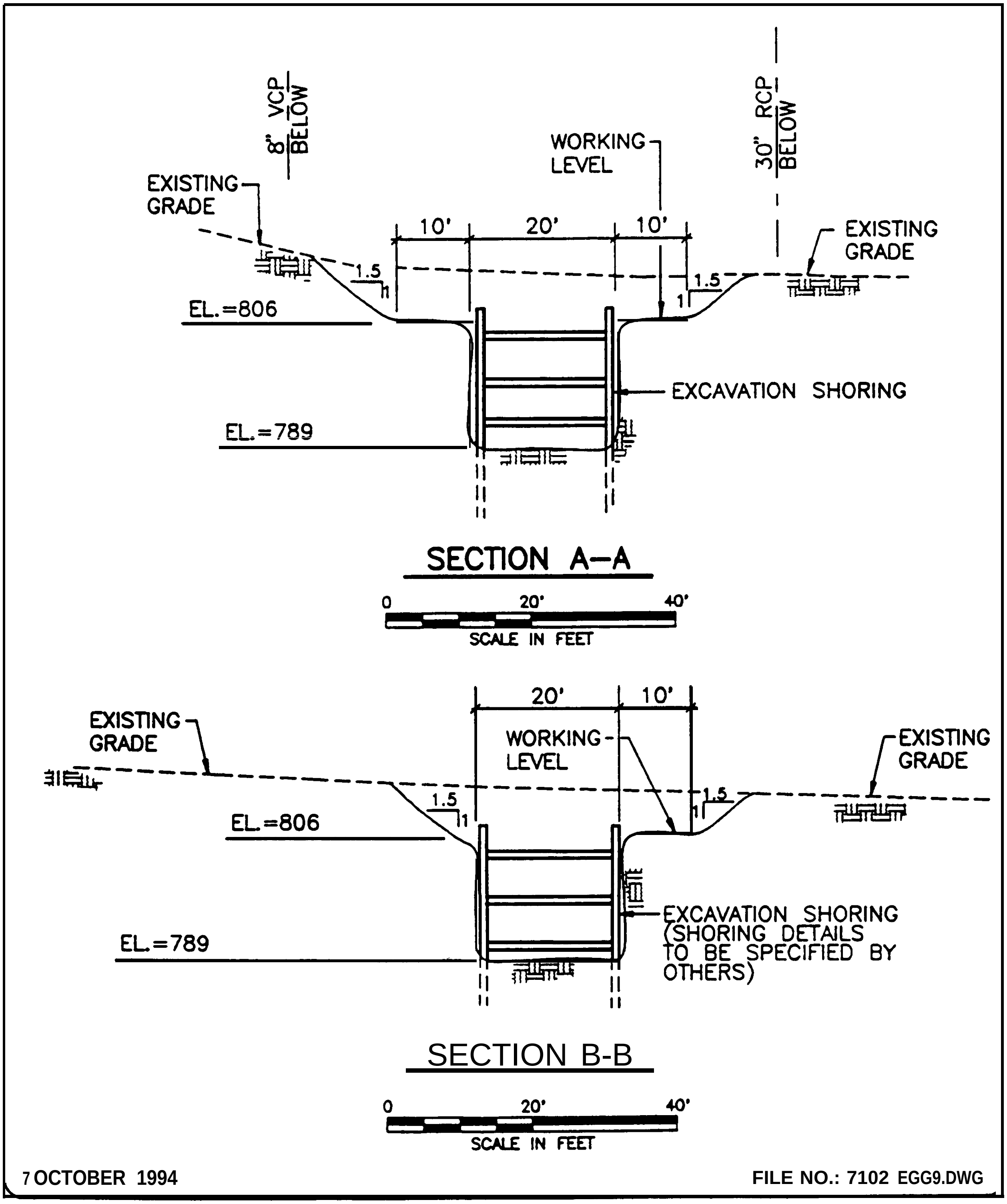

Figure 3.2. Profile of Excavation Shoring

OU5, Area 7 Removal Action Work Plan
October 1994

The dewatering system will be installed and activated prior to the excavation activities. Groundwater is expected to be encountered at 17 ft BGS and dewatering is required to lower the groundwater table to at least 23 ft BGS. Total dewatering flow is expected to be a maximum of 15 gpm or 20,000 gpd. Dewatering will be accomplished by a well point system designed by a Specialty Contractor. Excavated groundwater will be pumped to the asphalt lined pond. Figure 3.3 presents a conceptual layout of the dewatering system.	
3.4.1.2. **Uncertainty Analysis**	
Table III. 1 presents the uncertainty analysis for the excavation portion of the removal action.	**Uncertainties and possible deviations.**
The following are the six potential deviations that have a medium or high probability of occurring. Contingency plans for these potential deviations are included in Table III. 1 and are incorporated into the excavation design approach. • Contamination is widely dispersed in the subsoil. • The septic tank will be located in the excavation. • Groundwater will be encountered in the excavation. • Surface water will enter the excavation. • Saturated soil will be encountered. • Unknown utilities will be uncovered by the excavation.	
It is expected that the actinium-contaminated soil is confined to a relatively small volume located within the proposed excavation zone. Historical information documents the potential migration of contamination from the source. Also, the area has not been fully characterized. Thus, there is the likelihood that the contamination is not concentrated at the source. If this is the case, a contingency plan is needed after the excavation of the 20 ft x 20 ft x 17 ft target volume of soil is completed. Field instruments will be used to scan each bucket per the radiation work permit (RWP), to determine if elevated radiological contamination is present at the excavation walls. If the contamination is still present above clean-up levels, the contingency plan is for DOE to decide if the removal action is to be expanded.	Deviation. Monitoring. **Contingency plan.**
It is assumed that the septic tank will not be uncovered during the excavation to a depth of 23 feet BGS. Based on the GPR results and	Deviation.

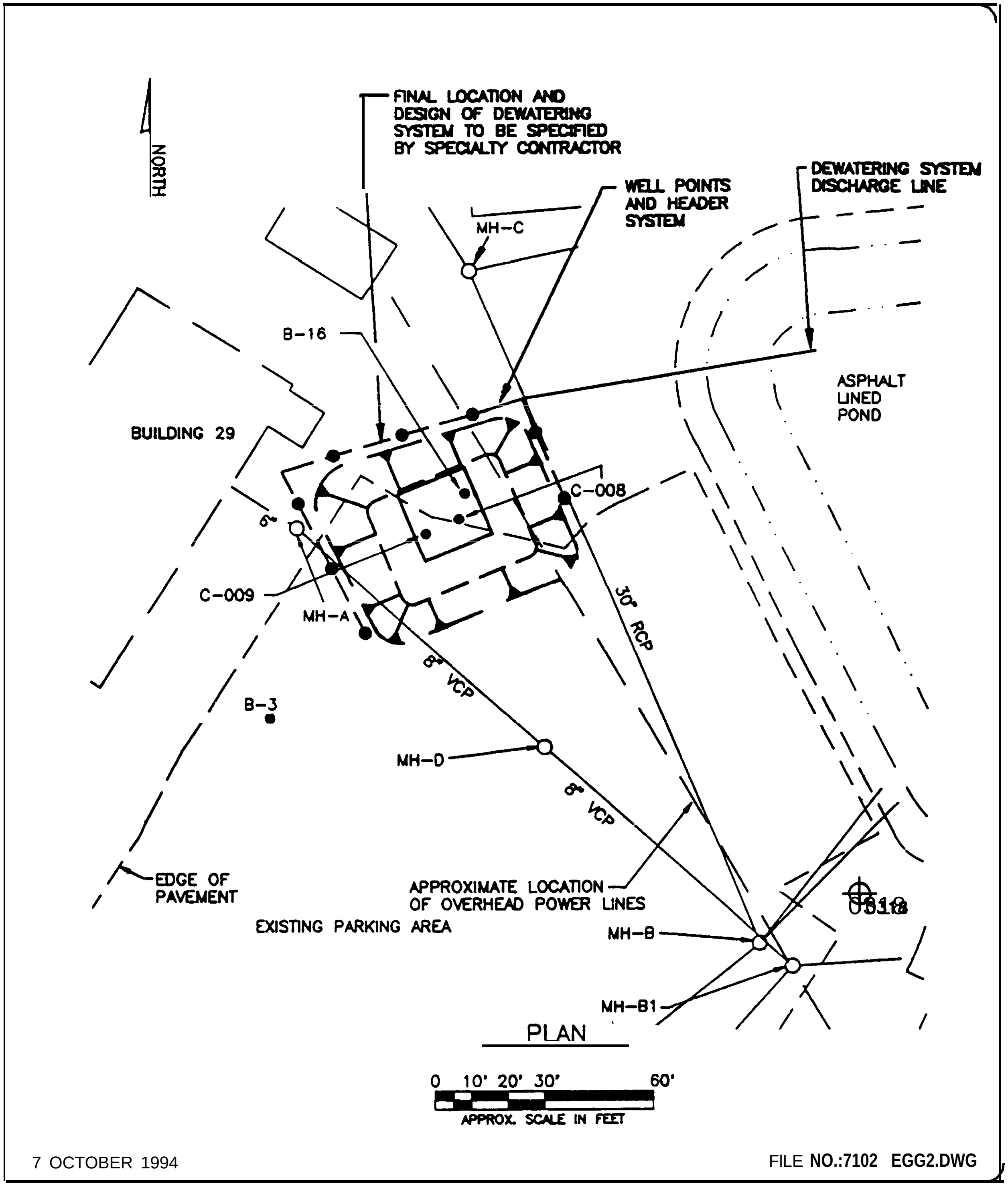

Figure 3.3. Conceptual Layout of Excavation Dewatering System

OU5, Area 7 Removal Action Work Plan
October 1994

Table III.1. Excavation Uncertainty Analysis
Page 1 of 2

Expected Conditions	Potential Deviations	Monitoring	Contingency Plan	Evaluation
Contamination is concentrated in a relatively small volume, rather than generally dispersed. Horizontal location is uncertain, but the majority of the contamination is assumed to lie within a volume 20 ft x 20 ft x 17 ft at a depth up to 23 ft BGS.	Contamination is widely dispersed. Most of the contamination, or the contamination source, is located outside of the selected 20 ft x 20 ft x 17 ft volume.	Using field instruments per RWP, monitor buckets for elevated rad concentrations at excavation face or at the bottom of the excavation. Contamination confirmed by field monitoring and lab analysis. Compare to clean-up goals.	DOE can decide whether or not to expand removal action scope. As defined, this removal action objective is to remove actinium contaminated soil within the 20 ft x 20 ft x 17 ft volume.	Medium probability; contingency plan included in design.
No hazardous wastes will be encountered.	Mercury and/or lead are encountered.	Preliminary analysis of B-16 soil and groundwater samples indicates no significant levels of VOCs, SVOCs, metals, rads. Field instruments (per RWP) will monitor for VOCs and SVOCs.	HSP/FSP have contingency plans for worker H&S.	Low probability; include monitoring deviation in design.
Septic tank not located at 18 ft to 23 ft BGS within excavation.	Tank found within excavation.	Visual (Mound Field Coordinator).	Excavate and remove tank.	Medium probability; included in design.
Soil is Class C (fill).	Soil not Class C.	Visual. No monitoring plan.	Class C is conservative assumption. No change in approach required.	Low probability; not included in design.
Groundwater will not be encountered because dewatering will work.	Groundwater will be encountered.	Visual (Mound Field Coordinator).	Excavate only to groundwater level.	Medium probability; included in design.
No significant rainfall events (greater than 1 inch/day) will occur during the excavation.	Significant rainfall will cause standing water in excavation.	Visual (Mound Field Coordinator).	Pump water into portable storage tanks. Pumps and containers to be available on-site.	Medium probability; included in design.
Saturated contaminated soil will not be encountered.	Saturated soil will be encountered.	Visual (Mound Field Coordinator).	-Stockpile soil on slope of excavation to dry. -D&D decision to add absorbent material to LSA box, per MD-10332. -Decision to not excavate into water.	Medium probability; will be included in design. Absorbent material to be available on-site.

Table III. . Excavation Uncertainty Analysis
Page 2 of 2

Expected Conditions	Potential Deviations	Monitoring	Contingency Plan	Evaluation
The storm and sanitary sewers will not be impacted by the excavation because the excavation will be shored and will not be close enough to the sewers to affect them. No other utilities will be encountered.	Storm sewer and/or sanitary sewer will be impacted by excavation.	-Visual (Mound Field Coordinator). -Monitor shoring system.	-Reroute or repair utility. -Evaluate impact of ground deflection.	Low probability; shoring included in design. Monitoring of ground deflection will be included in design.
	Other utilities will be	Utility survey prior o excavation.	-If abandoned - remove; -If active - reroute	Medium probability; included in design.
Excavation depths of 19.5 ft are possible with the available trackhoe.	Excavation to 19.5 ft not possible.	Visual (Mound Field	-Excavate to maximum possible depth. -Install bench to compensate. Design requires 17 ft. (max). -Use alternate excavation equipment.	Low probability; not included in design.
Building 29 utilities (electric, water, and compressed air) can support the removal.	During excavation, sufficient Building 29 utilities are not available, or need increases above expected.	Tripped circuit breakers, low pressure, etc.	-Obtain utility service from other buildings (pre-approval/D&D). -Provide portable sources.	Low probability; not included in design.

radiological results from soil borings C-008, C-009, and B-16, there is a medium probability that the septic tank will be discovered. If the tank is uncovered, the contingency plan is to remove the tank contents, demolish the tank, remove the tank sections from the excavation, and dispose of the material as low specific activity (LSA) waste.	**Monitoring.** **Contingency plan.**
A contingency plan will be needed if groundwater is encountered during the excavation. The expected condition is the groundwater dewatering system will be effective in keeping the excavation dry. There is, however, very little information on the characteristics of the aquifer. If the dewatering system is not effective in keeping the excavation dry, the contingency plan is to stop the excavation at the groundwater table.	**Expected condition.** **Uncertainty.** **Contingency plan.**
In addition to groundwater, water can accumulate in the excavation from rainfall. The expected condition is that there will not be rainfall of sufficient intensity or duration to result in rainwater accumulating in the excavation. If significant rainfall event occurs during the excavation activities, the contingency plan will be to pump the water to portable containers,	**Uncertainty.** **Contingency plan.**
Saturated soil may be encountered during the excavation. There is a relatively strong probability of this deviation occurring because the clay soils may contain a high moisture content that cannot be reduced by well point dewatering. Excavated saturated soil will be placed on the slope or bench of the excavation and allowed to dry. The Mound Field Coordinator will visually determine when the stockpiled soil is sufficiently dry to be loaded into LSA boxes. Moisture absorbent material will be added to the LSA boxes as necessary per Mound MD-10332.	**Uncertainty.** **Contingency plan.** **Monitoring.**
The final deviation to the excavation approach that is included in the design is the potential for encountering unknown buried utilities during the excavation. Additional underground utilities are suspected in the area of the excavation, and have a medium probability of occurrence based on interviews with Mound Plant workers. Although the surface will be examined for buried utilities prior to excavation, if unknown utilities are uncovered and found to be abandoned, the contingency plan is to remove the utility following Mound procedures. If the utility is active, the line will be rerouted around the excavation area.	
3.4.1.3. Monitoring	
The monitoring and sampling strategy selected for the expected excavation approach will focus on the activities related to the progression of the excavation. Specific monitoring activities include, but are not necessarily limited to the following:	**Monitoring plans for defining deviations.**

- Monitor concrete and asphalt for radioactive contamination as it is removed.

- Monitor each bucket of excavated soil for organic vapors and radioactive contamination.

- Visually monitor the excavation for evidence of buried waste (e.g., crushed containers, potentially contaminated equipment, discolored soil).

- Visually monitor the excavation for saturated soil or standing water.

- Visually monitor the excavated area for unknown buried utilities.

3.4.2. Temporay Storage

The purpose of temporary storage is to support the removal action effort by providing an adequate and secure staging area for the soil and groundwater during their evaluation prior to final disposition. The temporary storage expected approach, as described in the following sections, is based on the materials that require handling from the excavation.

Ideally, the type and concentration of soil contamination should be determined at the time of placement into the boxes. However, due to the time required to ascertain whether the soil is contaminated or not (i.e., to the level of precision required by the clean-up standards), a staging concept has been selected to permit the excavation process to proceed unimpeded by the sampling and analysis timing requirements.

3.4.2.1. Expected Approach

Expected conditions.

The removal action expected approach requires temporary storage of

- empty LSA boxes, empty water storage tanks;
- excavated soil/septic tank debris in boxes;
- groundwater;
- surface water runoff; and
- decontamination rinsate

The temporary storage area shall have areas designated for empty LSA boxes, filled LSA boxes, equipment storage, and water storage tanks (see Figure 3.4). The area shall have sufficient aisle clearance for trucks and fork lifts to maneuver.

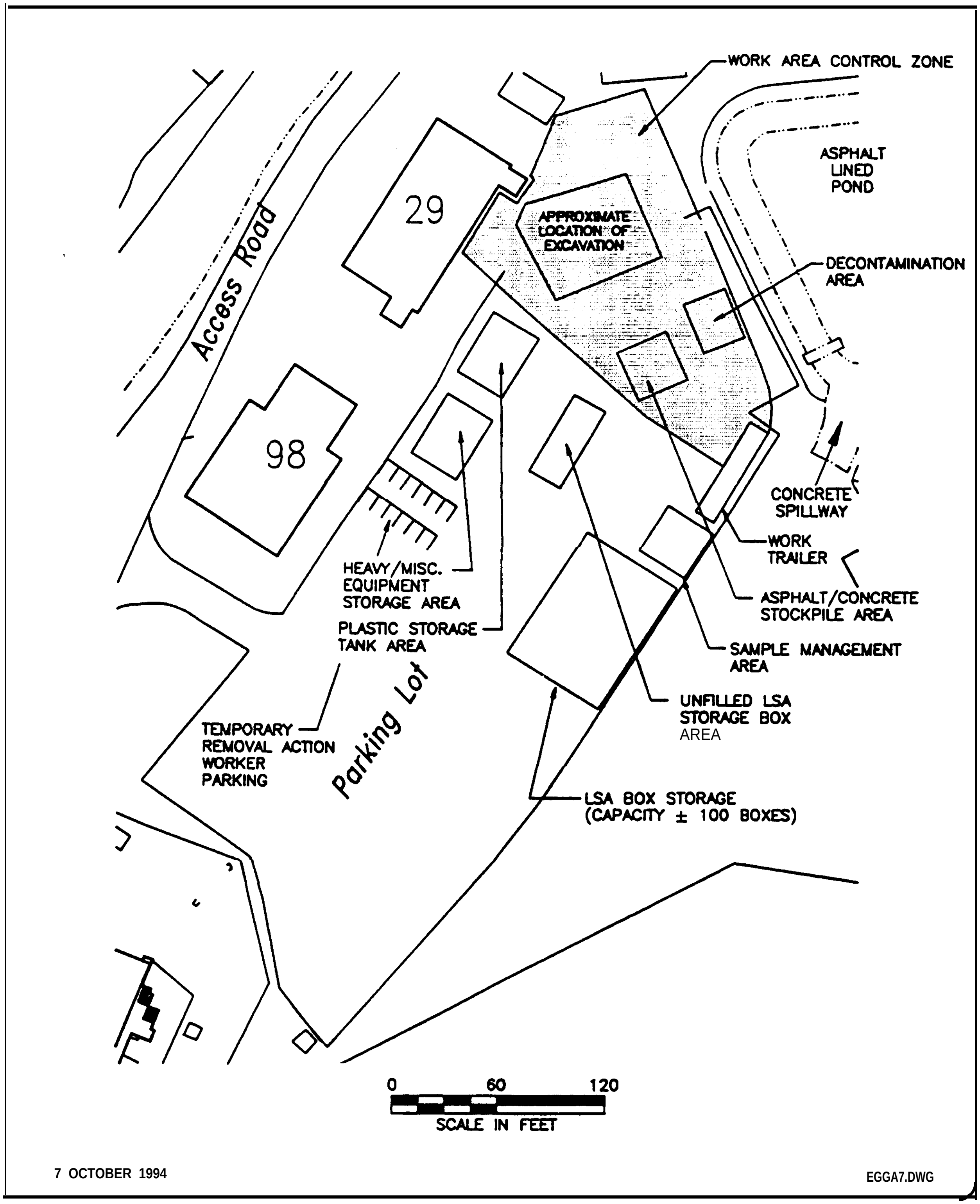

Figure 3.4. Area 7 Temporary Storage

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LSA-type storage containers (B-25 boxes) sufficient to store excavated soil will be available. As soon as each box is filled (2-3 cu yd of excavated soil), the box will be moved from the excavation site to a designated staging area in the Area 7 parking lot, located to the southeast of the excavation site, as shown in Figure 3.4. Each box will have five sample cores taken (one from each corner plus one from the center) and composite into a single sample for analysis at the Mound Soil Screening facility (radioactive analysis) and the Mound Analytical laboratory (gamma-spectrum analysis) See (FSP, Appendix C). After each box has been sampled, it will be sealed and secured, in accordance with Mound procedure MD-10332.

Groundwater removed by the excavation dewatering system will be transferred and temporarily stored in the adjacent asphalt-lined pond. The pond provides controlled discharge through a drainage ditch into an on-site retention pond, prior to release off-site. Since the groundwater is expected to be uncontaminated, it will not require treatment prior to discharge. The capacity of the pond is approximately 1.5 million gallons, which exceeds the maximum projected groundwater volume. The dewatering system discharge will be monitored for contamination.

If surface water flows onto the site, it will be collected and pumped into plastic storage tanks located adjacent to the excavation area, in the Area 7 parking lot. Similarly, any decontamination rinsate will be transferred to the storage tanks. Samples of water will be taken from the storage tanks and analyzed at the Mound laboratory for radioactive contamination, pending further treatment and/or disposal.

Clean backfill (CERCLA requirements) will be required from off-site sources. When backfilling activities begin, the backfill will be transferred directly to the site by truck and placed in lifts into the excavation. Consequently, it is not expected to require temporary storage.

3.4.2.2 Uncertainty Analysis

The conditions expected to impact temporary storage activities are shown in an uncertainty analysis (Table III.2). As a result of this analysis, the expected temporary staging approach was modified to include the following contingencies:

Uncertainties, evaluation, contingency plans for temporary storage.

- contaminated groundwater; and
- non-WS12 criteria debris (Mound Plant criteria for debris).

If contaminated groundwater is detected by the dewatering system monitors, the dewatering process will be discontinued and the

Table III.2. Temporary Storage Uncertainty Analysis

Expected Conditions	Potential Deviations	Monitoring	Contingency Plan	Evaluation
Groundwater contamination will not be encountered above the asphalt-lined pond (NPDES) permit release limits.	Groundwater contamination is encountered above NPDES limit.	-Pond 24-hour composite sample analysis test for constituents required per NPDES limit. -Groundwater discharge monitored for rads and VOCs.	-Discontinue dewatering. -Excavation will not extend below groundwater table.	Low probability; include contingency plan in design.
The asphalt-lined pond has sufficient capacity for storage of pumped groundwater.	Groundwater discharge from dewatering system exceeds asphalt-lined pond capacity.	Monitor pond level during dewatering (Mound Field Coordinator).	-Pond capacity (1.5 Mgal) greater than expected groundwater volume. -Do not excavate below groundwater elevation. -Decrease dewatering rate	Low probability; include monitoring for deviation in design.
Sufficient LSA boxes are available for storage of all excavated soil.	Volume of excavated soil exceeds available supply of LSA boxes.	Visual (Mound Field Coordinator).	-Stop excavation. -Procure additional boxes.	Low probability; not include in design.
Clean backfill will be available as needed from offsite.	Clean backfill requires temporary staging.	NA	Provide temporary staging area.	Low probability; not included in design
Excavated soil complies with Mound WS12 criteria.	Soil contains debris that does not comply with WS12.	Visual (Mound Field Coordinator) per Mound HP procedures manual (WS12 criteria).	Segregate debris and store in debris LSA box.	Low probability; include contingency plan in design.

excavation will not be permitted to extend below the groundwater table. Contaminated groundwater will not be temporarily stored in the staging area. If the runoff water in the asphalt lined pond exceeds the NPDES discharge limits, the water will be pumped into a tanker truck and either transferred to WD Building for treatment and processing, or transferred elsewhere on Mound site for solidification and off-site disposal.

If any debris is encountered during the excavation process that does not meet Mound's WS 12 criteria, it will be placed into LSA boxes identified for debris, and transferred to the staging area, pending disposal.

3.4.2.3. Monitoring/Sampling

Based on the expected approach (as modified by the uncertainly analysis), the temporary storage monitoring and sampling strategy includes, but is not limited to, the following.

Monitoring for deviations related to temporary storage.

- Sample staged LSA boxes for Mound laboratory analysis, per FSP (Appendix C)
- Visually monitor pond water level during dewatering activities, to determine rate of increase.
- Monitor groundwater discharge for radioactive and chemical contamination, per FSP.
- Monitor pond (24-hr composite sample) to determine if excavated groundwater exceeds NPDES discharge limits.
- Monitor LSA box inventory to assure adequate supply .
- Monitor temporary staging area for evidence of leaking containers or storage tanks, deterioration, parking lot surface cracking, etc.
- Monitor WD Building treatment and storage capacity, if surface water runoff has been transferred to plastic storage tanks.

  Swipe all equipment that has been decontaminated to confirm that levels of removable contamination meet Mound Health Physics (HP) requirements.

- Sample/analyze any surface water or decontamination rinsate from the excavation that was transferred to plastic storage tanks to determine if it can be treated in the WD Building.

3.4.3 <u>Waste Management/Disposal</u>

The waste management task encompasses the transfer of waste and materials from the removal action site to other locations that routinely manage/dispose of the wastes generated in removals. The expected waste management/disposal approach for this removal action is described in the following subsections in terms of the excavation and temporary storage needs.

3.4.3.1. Expected Approach

The removal action expected approach requires waste management/disposal of:

Expected waste management conditions.

- filled LSA boxes;
- construction debris on liners;
- surface water (plastic tanks);
- unused empty boxes, liners, plastic tanks;
- excavation equipment; and
- decontamination rinsate.

The soil in the LSA boxes will require staging until the Mound Field Coordinator decides it will be transferred to interim storage elsewhere at Mound, pending a decision for final disposal. The LSA boxes will remain at the Mound interim storage location pending authorization to ship boxes to an approved off-site disposal facility. Boxes will be sampled on a random basis in accordance with Mound Procedure MD-8 1240 for waste characterization before off-site disposal.

Construction debris (certified as clean per HP survey) will be shipped directly from the Area 7 parking lot staging area via truck to the Mound Spoils Area.

The surface water (if any) which has been stored in plastic tanks will be transferred by tanker trucks to the Mound WD Building for treatment and disposal.

Any unused and empty LSA boxes, stockpile plastic liners, and plastic tanks will be decontaminated as necessary and transferred to storage for re-use in future ER projects. Excavation equipment and containers that were exposed or potentially exposed to contaminated soils or groundwater will be decontaminated and transferred to D&D for future use.

All decontamination rinsate stored in plastic tanks will be collected in tanker trucks and transferred to the Mound WD Building for treatment and disposal.

3.4.3.2. Uncertainly Analysis

The conditions expected to impact waste management/disposal activities are shown in an uncertainty analysis (Table III. 3). As a result of this analysis, the expected waste management/disposal approach was modified to include the following contingency plans:

Uncertainties, evaluation, and contingency plans related to waste management.

- Resource Conservation and Recovery Act (RCRA) waste;
- Transuranic (TRU) waste;
- contaminated asphalt/concrete;
- water WD Building cannot process; and
- non-WS 12 criteria debris.

RCRA waste boxes will be transferred to a RCRA disposal facility or to Mound interim RCRA storage, pending final disposition. Mixed waste (RCRA and LSA) will be transferred to the Mound interim mixed waste storage facility, pending final disposition.

Based on results from the Mound Soil Screening facility, LSA boxes will be re-labeled as TRU waste and will be transferred to the Mound interim storage location, in a manner similar to LSA boxes (above). Contaminated asphalt/concrete waste will be disposed in the same manner as LSA boxes.

Water that WD Building cannot process will be transferred from temporary plastic storage tanks via tanker truck to another location at Mound for solidification, packaging, and disposal as LSA waste.

Non-WS 12 criteria debris will be disposed in the same manner as LSA boxes.

Table III.3. Waste Management and Disposal Uncertainty Analysis

Expected Conditions	Potential Deviations	Monitoring	Contingency Plan	Evaluation
No RCRA waste will be excavated.	RCRA wastes will be excavated.	Lab analysis of box samples for waste characterization.	-If rads are present, dispose as mixed waste; if no rads present, dispose in accordance with Mound procedures. -Perform additional lab analysis	Low probability; not included in design.
No transuranic contaminated soil will be excavated.	Transuranic soil will be encountered.	FIDLER and laboratory analysis. Compare to TRU criteria (NTS).	Change labelling on LSA boxes to TRU waste and store per Mound procedures pending disposal decision	Low probability; include contingency plan in design.
Asphalt and concrete are not contaminated.	Asphalt and concrete are contaminated.	Direct readings and swipes per Mound procedure MD-80036	Segregate materials and dispose in LSA boxes.	Low probability; include contingency plan in design
Storm water entering excavation will be pumped into plastic storage containers and shipped to WD building.	Storm water encountered that WD cannot process.	Laboratory analysis for rads. of samples collected from the storage tanks.	-Store onsite in plastic tanks pending disposal decision. -solidify and package as LSA waste	Low probability; include contingency plan in design.
Rad contamination encountered in excavated soils.	Some LSA boxes have clean soil.	Sample boxes for waste characterization at temporary storage.	Soil below offsite disposal limits requires other disposal (e.g., Mound Spoils Area or TBD).	Medium probability; resolution not included in design.

3.4.3.3. Monitoring/Sampling	
Based on the expected approach (as modified by the uncertainty analysis), the waste management/disposal monitoring and sampling strategy will be to sample/analyze LSA/TRU boxes at the Mound interim storage location as required to meet the waste acceptance criteria of the approved off-site disposal location.	Monitoring plans.
3.5. DESIGN FLOW DIAGRAM	
The expected approach, as modified by the results of the uncertainty analysis, and incorporating the monitoring and sampling requirements, is described in the flow diagram (Figure 3.5) for the sequence of work and excavation, temporary storage, and waste management/disposal approaches.	Graphic of design approach with monitoring decision points and contingencies.
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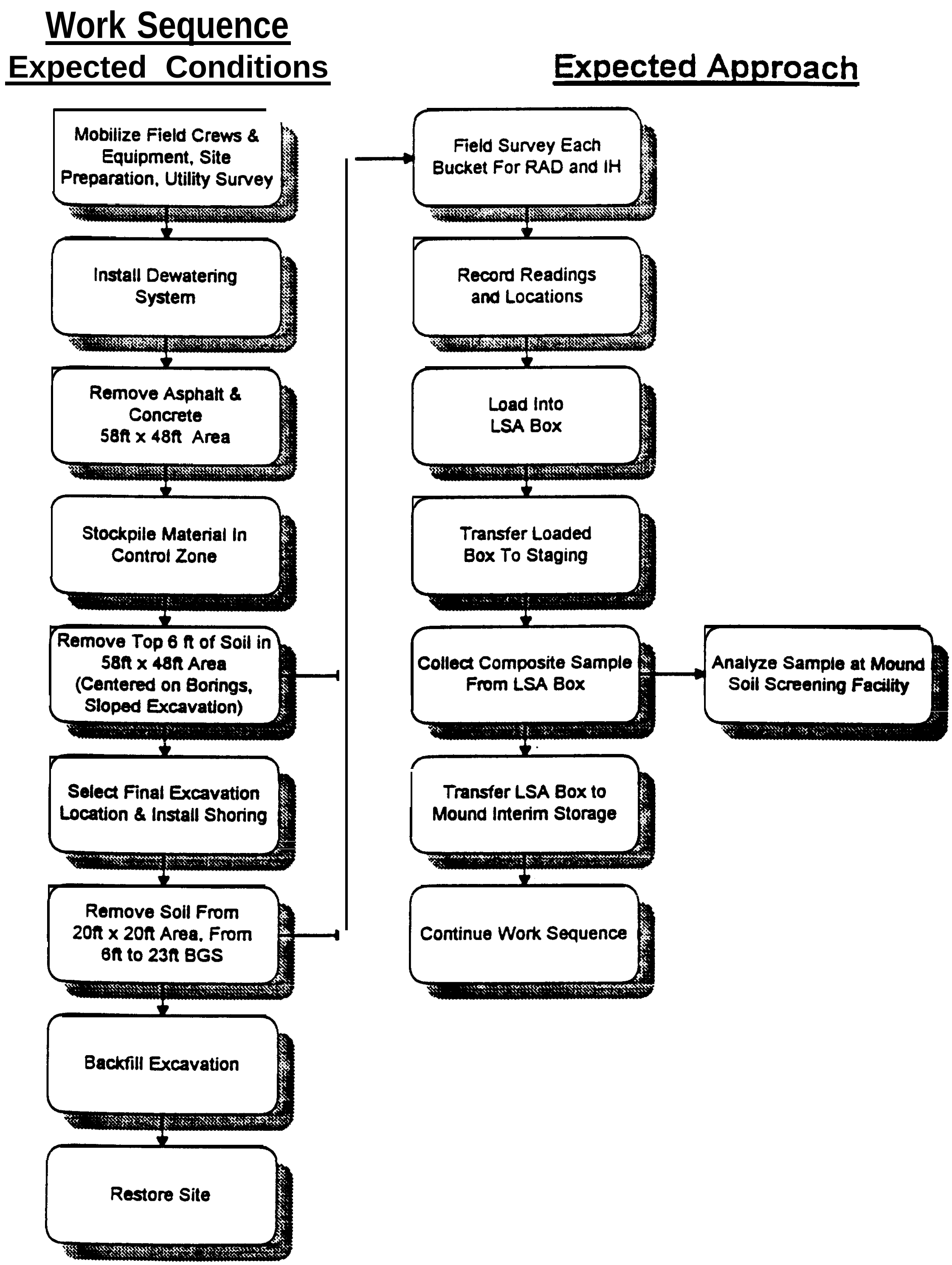

Figure 3.5. Design Flow Diagram
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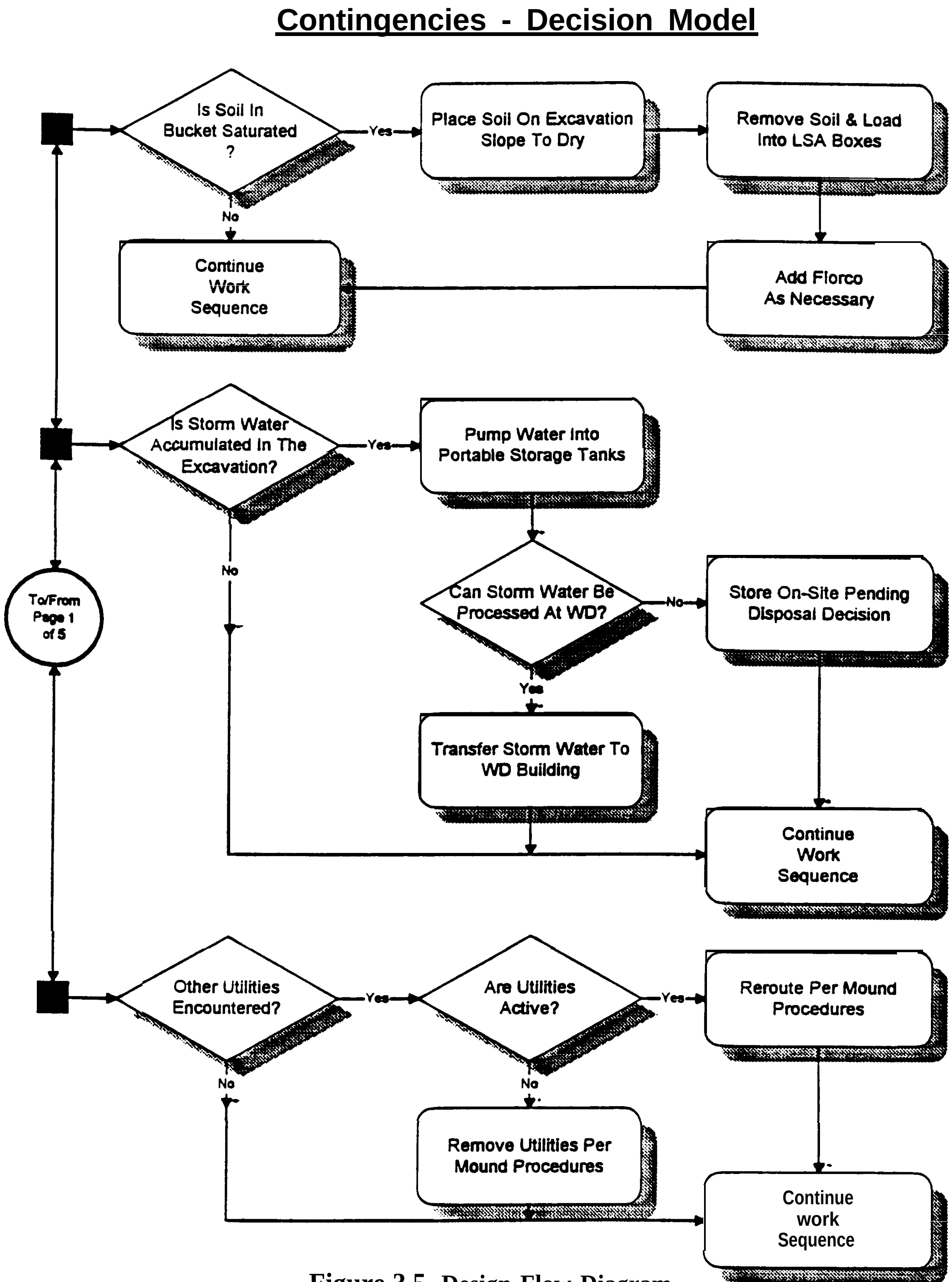

Figure 3.5. Design Flow Diagram
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Contingencies - Decision Model

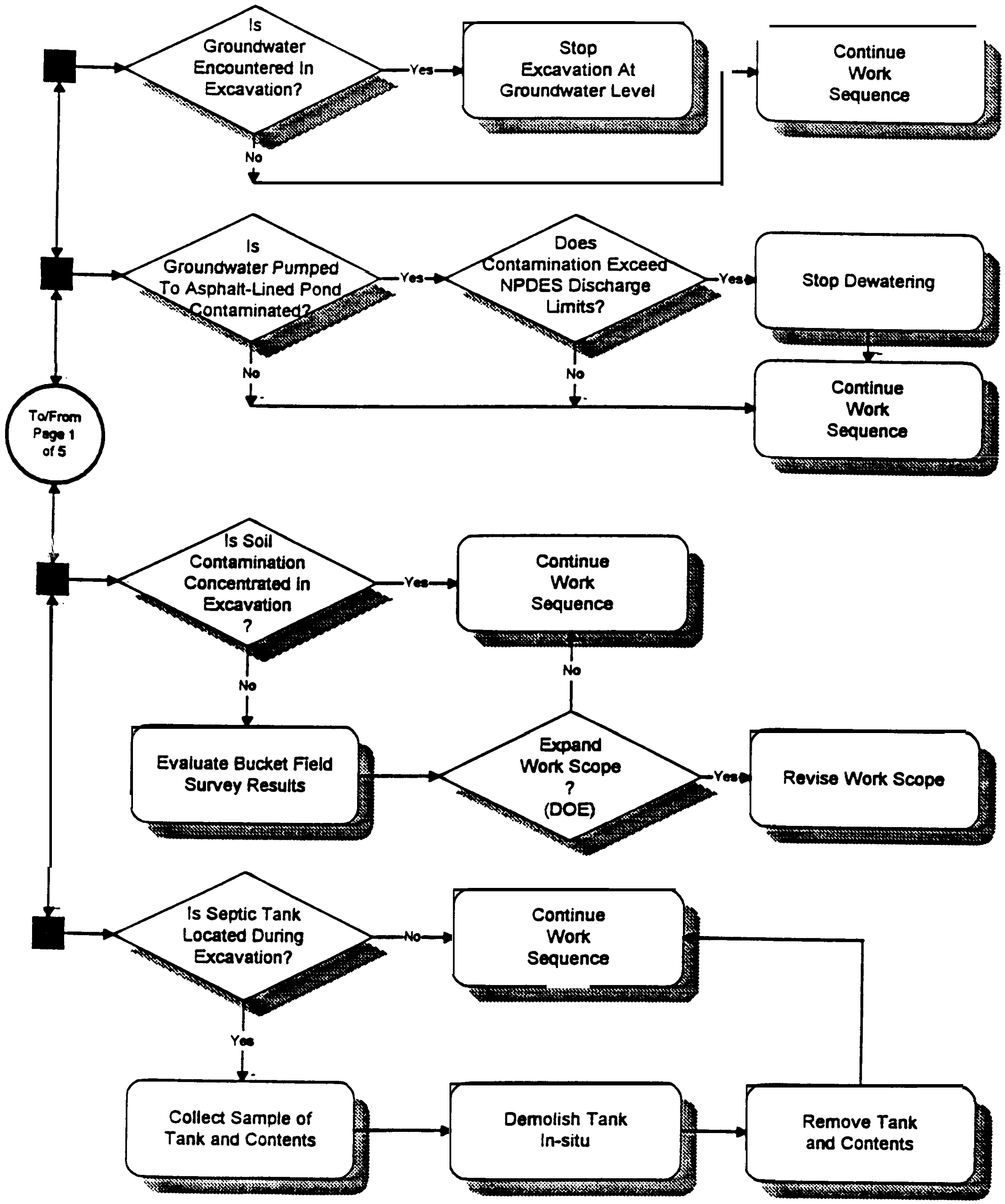

Figure 3.5. **Design Flow Diagram**
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Contingencies - Decision Model

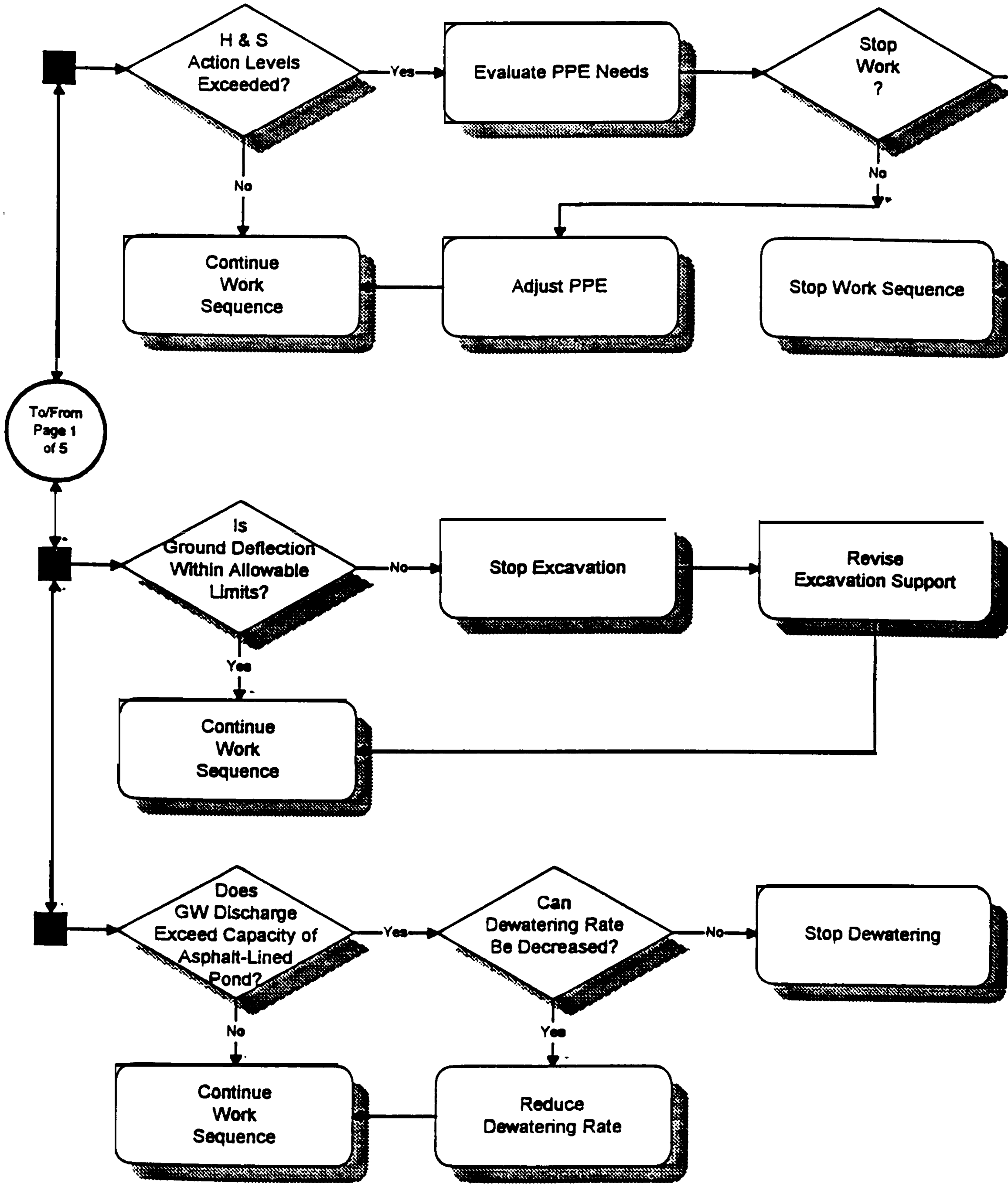

Figure 3.5. Design Flow Diagram
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Contingencies - Decision Model

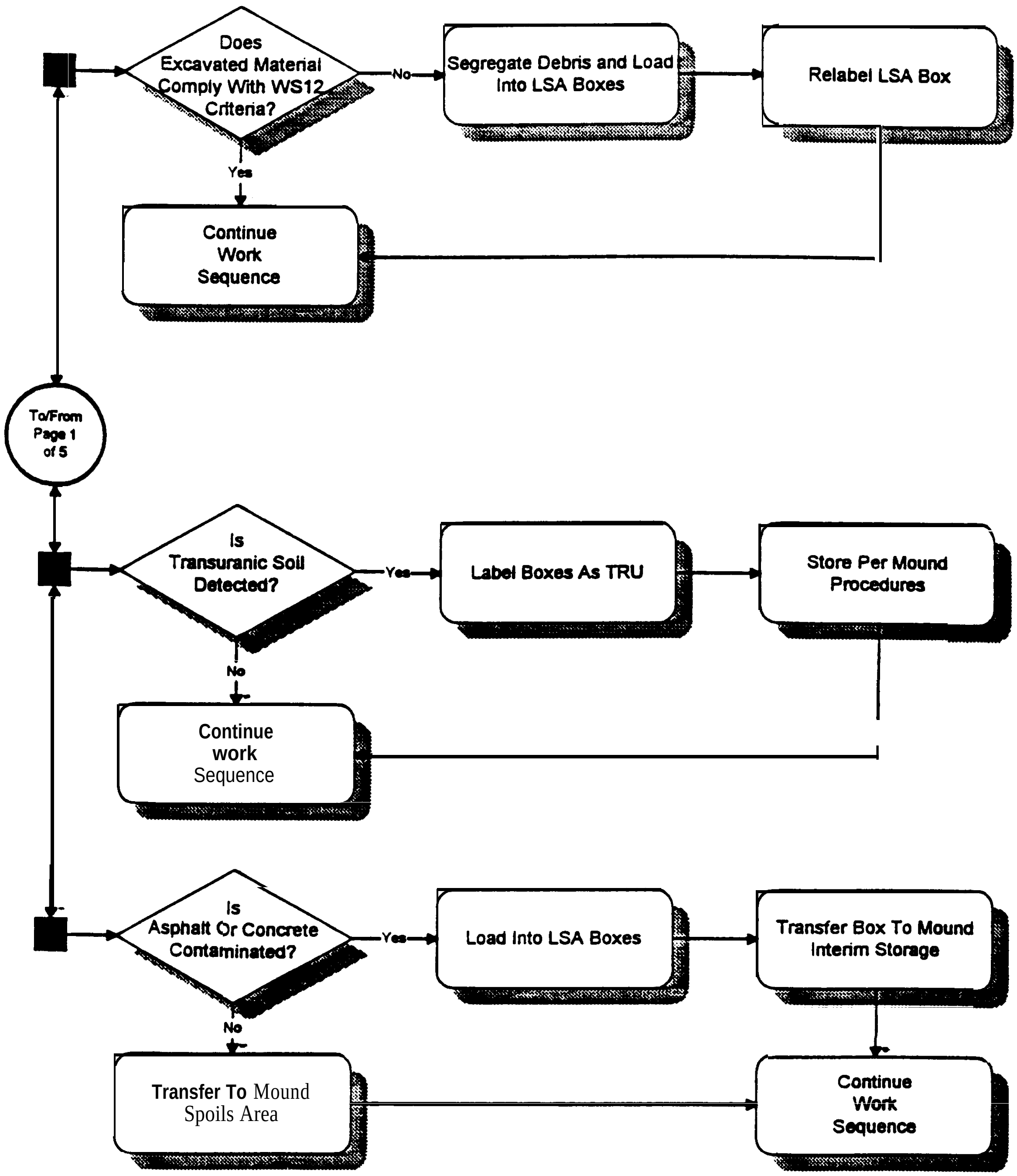

Figure 3.5. Design Flow Diagram
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Note F, **Time-Critical Removal Action Logistics Checklist.**

ARARs compliance. Complying with ARARs may require some preparations. For example, if compliance with a National Pollutant Discharge Elimination System (NPDES) discharge limit is necessary, some preparations will be necessary for sample analysis and monitoring **as** well as reporting on compliance. Any ARAR that will require specific actions during the removal is likely to require some preparations prior to or during mobilization.

Procurement of contractors and specialty subcontractors. Many removal actions at DOE facilities will be implemented using site forces, thus reducing or eliminating the need to procure outside services for a time-critical removal action. However, many removal actions are likely to require procurement of at least specialty subcontractors for treatment, disposal, or certain special aspects of construction (e.g., a shoring subcontractor). Procurement can require several months and may need to begin during the planning phase. For emergency actions (time-critical removals frequently qualify), provisions in the Federal Acquisition Regulations and DOE Orders allow some of the procurement requirements to be waived, thus enabling rapid procurement of special services, equipment, or materials.

Equipment and materials acquisition. Any special equipment, especially if it will have to be fabricated or cannot be obtained locally, will require some lead time. For a time-critical removal, acquisition of such equipment or materials should begin as soon as the need is identified.

Utilities (providing power, water, septic, etc. during removal action). Utility services to support the removal action will often be problematic at DOE sites because of the remote locations of some removal action sites or site security requirements. Generators may be required if electrical power is unavailable. Potable water, toilet/shower facilities, and fuel requirements must be assessed and resolved prior to or during mobilization.

Permits. Removal actions, if conducted entirely onsite, are exempt from permits that would otherwise be required (though the substantive requirements may have to be met). Some permits (e.g., modifications to NPDES permits, and excavation permits) may be required. Lead time required for permitting issues can easily delay a time-critical removal. Necessary permits should be identified and work toward obtaining them begun as early as possible during the planing phase.

Site access. Access to the removal site will typically not be a problem at a DOE site unless the removal is offsite (i.e., not on the DOE facility property). Access to adjacent areas that might be needed (e.g., for a staging area) or access to or through adjacent private property can be difficult to arrange. Any site access needs should be identified and work toward obtaining access should be begun as early as possible during the planing phase.

Staging areas. Space to implement the removal action typically will greatly exceed the immediate area of contamination. Space for access routes, parking, material lay-down yards, temporary storage of wastes and other materials, sampling/analytical activities, offices, equipment staging and decontamination, and other activities must be arranged in advance of mobilization.

Decontamination (e.g., of equipment that leaves the site). Decontamination typically is needed for any equipment that will be removed from a facility or that will be moved between waste units during a removal. Decontamination facilities and capacity are required for capture and treatment of any rinse water or other waste generated during decontamination. Space for a decontamination facility is one of several needs for a staging area adjacent to the removal site.

Site security. Because of the secure nature of most DOE sites, security during the removal action typically will not be a problem at a DOE site. However, removals in offsite areas or in any non-controlled area typically will require some arrangements for security. Security typically will be necessary for property protection and safety reasons.

Utility location/relocation (e.g., buried pipelines, buried power lines). Location of buried utilities in offsite areas is no different than for any private sector excavation project. However, onsite utilities can be difficult to locate at DOE sites because of the age of the facilities and the urgency under which many were constructed and modified. Documentation of underground utilities often is less than perfect at DOE sites. Working near aboveground and overhead utilities also can present challenges that must be identified and addressed early.

Management of remediation-derived wastes (i.e., treatment, storage, and/or disposal; temporary or permanent). Wastes have to be managed properly when taken from a site or otherwise generated during a removal action. Hazardous, radioactive, and mixed wastes have special requirements; but, even solid wastes have to be managed in accordance with local requirements. Plans for storing, treating, and disposing of all wastes generated during the removal action are a significant requirement during the planning phase. Space for temporary facilities; meeting the substantive requirements for a permit for a storage, treatment, or disposal facility; constructing treatment, storage, or disposal facilities; and/or arranging for offsite treatment, storage, or disposal can require considerable lead time. Such needs should be identified early in the planning phase and work on these issues should begin as soon as the need is identified.

Health and safety. Health and safety protection during the removal action is an important responsibility. Acquisition of the necessary Personal Protective Equipment (PPE), decontamination of reusable equipment, and disposal of used equipment are major considerations. Large removal actions can result in a need for major facilities for showering, personnel contamination screening, and PPE maintenance and distribution.

Personnel training. Because many site personnel have been extensively trained, limited health and safety training and familiarization with the removal action may be the only requirement. However, use of offsite contractors requires attention to ensure that all personnel are properly trained. Health and safety training (40 hour training), site procedures training (e.g., fire, emergency evacuation), quality assurance training, radiation safety training, confined space entry training, and training in the specifics of the Health and Safety Plan for the removal action are examples of the types of training that may be required.

Transportation (e.g., **of** materials **and wastes).** Transportation of all materials, equipment, and wastes should be arranged prior to beginning mobilization. Transportation of wastes can be an especially sensitive issue if any of the transport is over public roads. Need for use of licensed hazardous waste haulers, special equipment (trucks without tailgates, roll-off boxes, liners, tarps), and other similar issues are common if transporting hazardous wastes or if transporting any wastes through residential areas.

Monitoring during **the** removal (e.g., for deviations, **of** offsite migration **of** contamination, **of** progress, **of** removal effectiveness). A monitoring plan should be included in the Removal Action Work Plan (see Step 6). Monitoring will be required to measure progress and/or direct the removal, detect deviations from expected site conditions (which may require implementation of a contingency plan), detect offsite migration of contamination, confirm compliance with ARARs (e.g., NPDES discharge limits), and confirm effectiveness/completeness of the removal action. Arrangements will have to be made for all of the sampling and analysis, or other measurements, required to monitor the removal action.

Analytical services during the removal. Analytical services may be required to facilitate monitoring the removal action, directing an excavation effort, characterizing wastes being removed, segregating wastes for different management requirements, or other needs. All analytical needs should be identified in the work plan (see Step 6) and provided for prior to or during mobilization.

Preparations for possible implementation of contingency plans. Contingency plans are not expected to be needed, otherwise the deviation that triggers one of them would be the expected condition. Still, it is necessary to be ready to implement any of the contingency plans. Any requirements of the contingency plans, including any or all of the other categories of preparations listed in this step, should be provided for, at least on a contingency basis. For example, if a contingency plan would require switching to a different means of excavation, some preliminary arrangements to provide the different equipment, contractor, or personnel typically will be required, if the contingency plan is to be implemented efficiently and quickly.

Progress tracking and reporting. Progress of the removal action typically is monitored on a daily basis for two reasons: (1) reporting progress by the On-Scene Coordinator (OSC) through pollution reports (POLREPS) and (2) compensating a removal action contractor or subcontractor, if compensation is on a unit cost basis. Arrangements for tracking progress (who, what, when) should be outlined in the work plan (see Step 6). Some preliminary steps generally are required during mobilization to ensure progress is measured from the very beginning of the removal.

Community relations during mobilization, during the removal action, and during demobilization. Time-critical removal actions do not benefit from the longer planning phase available to longer term actions (see Module 3, Preconceptual Design) and thus do not afford significant opportunity for the public to be informed about the action that is being contemplated, Consequently, community relations immediately prior to mobilization and during the removal action assume a more critical role than for an early action. Planning for community relations should begin prior to mobilization, as early in the planning phase as possible. Community relations may need to extend through the demobilization phase.

Operation and maintenance after completion of the removal. Most removals will not require a continuing operation and maintenance phase immediately following the field activities. However, removals that involve facilities or structures that will require maintenance (e. g., caps that require care until a vegetative cover is established) or removals that involve facilities that will require a period of continuing operation (e.g., operation of a treatment process for water collected with a french drain installed as part of the removal) require advance planning and arrangements to ensure that those responsibilities are carried out once the removal is completed. Personnel, contracting mechanisms, equipment and materials, and other similar issues should be resolved in the work plan (see Step 6).